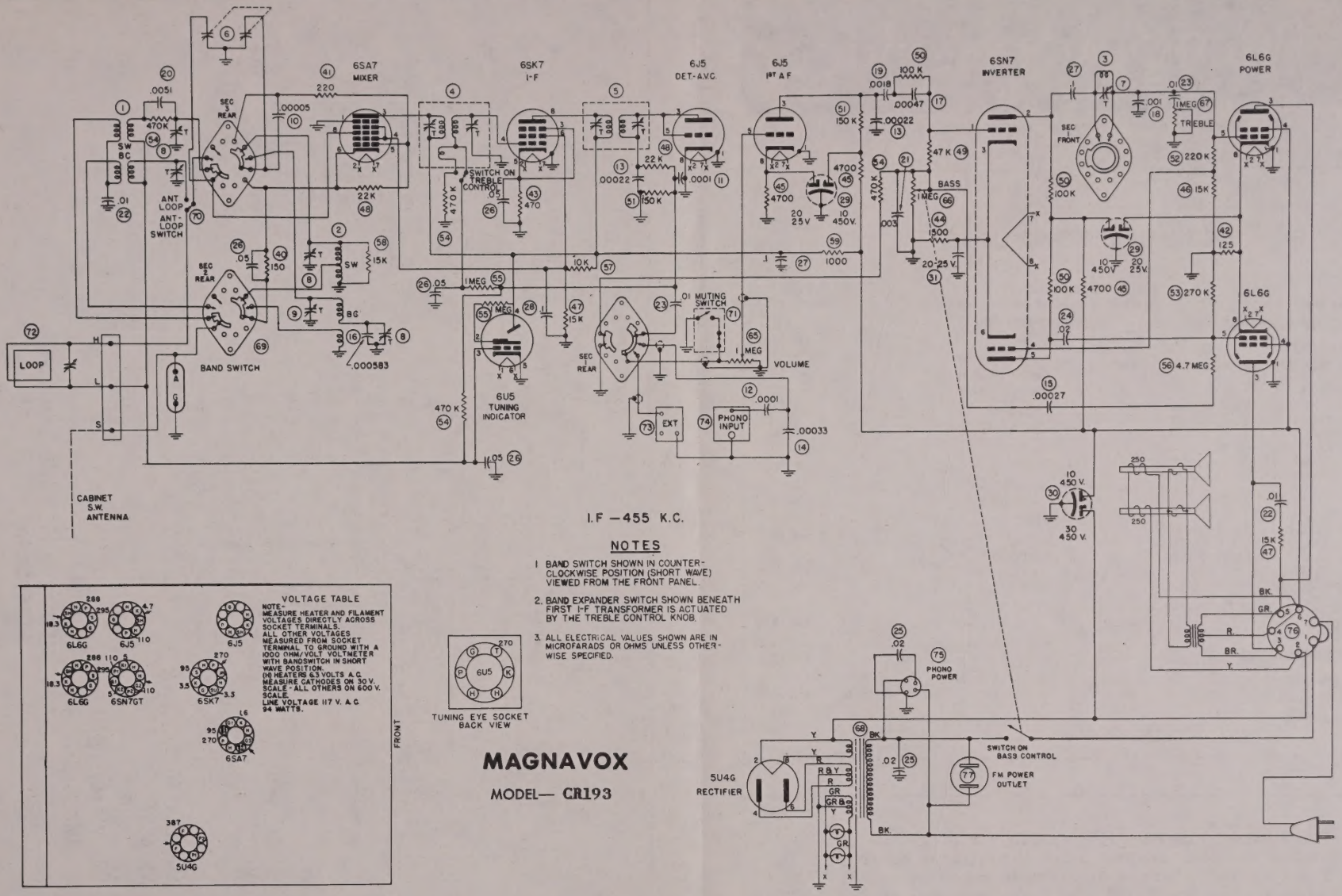
The PHOTOFACT Servicer

SET 426 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ JAN. 1, 1959

CONTENTS PHOTOFACT SET 426

TRADE NAME AND MODEL	SET AND FOLDER NO.
TELEVISION RECEIVERS	
PACKARD-BELL	
21C1, 21C2, 21T1, 24C1 (Ch. 88-5)	426-1
SILVERTONE	
9114, 9115, 9116, 9117, 9130, 9131, 9132, 9133, 9154, 9155, 9156, 9157, 9158, 9159, 9170, 9171, 9172, 9173, 9190, 9191, 9192, 9193 (Ch. 528.51360, 362, 363, 365, 366, 370, 372, 373, 380, 381, 382, 390, 391, 392, 440, 441, 450, 451)	426-2
ZENITH	
B1410L, LU, LUD, LZ, LZU, LZUD, B1411P, PU, PUD, PZ, PZU, PZUD, B1412G, GU, GUD, GZ, GZU, GZUD, B1413G, GU, GUD, GZ, GZU, GZUD, B1715L, LU, LUD, B1716C, CU, CUD, B1717J, JU, JUD, B1718B, BU, BUD, B1719P, PU, PUD, B1720C, CU, CUD, B2001L (Ch. 15B20, Q, U, UD)	426-3
OTHER EQUIPMENT	
ADMIRAL	
303, 304 (Ch. 6B3)	426-4
AUTOMATIC	
CL-100	426-5
DET-28	426-6
DAVID BOGEN	
K1630, K1630Y	426-7
EMERSON	
893B, 894B (Ch. 120430B, 120432B)	426-8
FANFARE	
533VM	426-9
HARMAN-KARDON	
A-10 (Allegro)	426-10
LEAK	
"Point-one Plus"	426-11
PHILCO	
F-974	426-12
T-6, T-600	426-13
STEELMAN	
3S9, 3S9T, 4D19, 4D20, 4D21	426-14
V-M Record Changer	
1500	426-15
WESTINGHOUSE	
HR-112AN, HR-113AN (Ch. V-2503-1)	426-16

The service information in this Servicer provides data on models which we have been unable to present in PHOTOFACT Folders. The receivers are not in current production; a requirement for PHOTOFACT coverage, and we are therefore presenting schematics and supplementary data that will be of assistance when servicing these models.



NOTES

1. BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE) VIEWED FROM THE FRONT PANEL.
2. BAND EXPANDER SWITCH SHOWN BENEATH FIRST I-F TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB.
3. ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

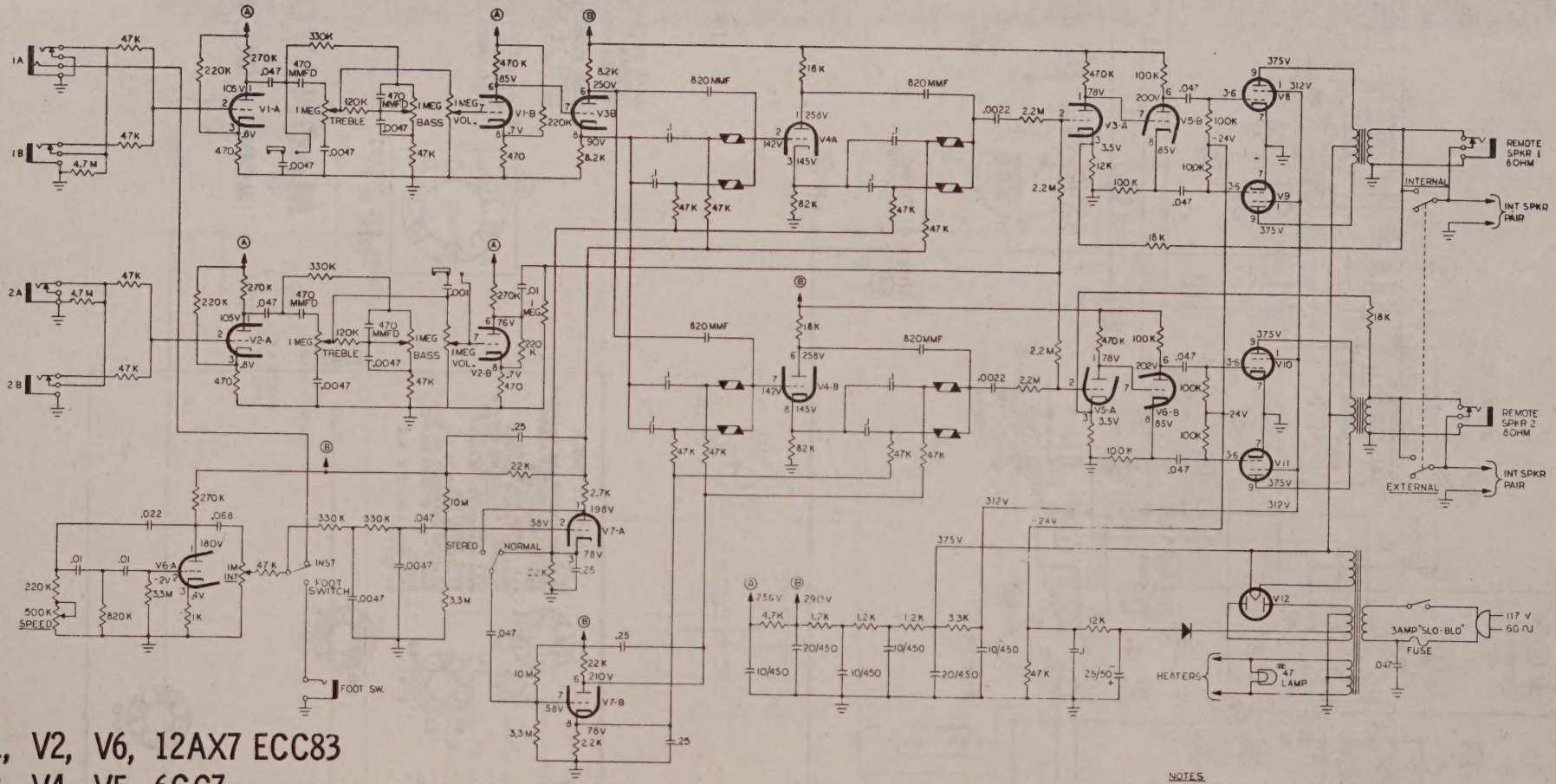
VOLTAGE TABLE

NOTE—
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BANDSWITCH IN SHORT WAVE POSITION.
(H) HEATERS 6.3 VOLTS A.C.
MEASURE CATHODES ON 30 V. SCALE - ALL OTHERS ON 600 V. SCALE.
LINE VOLTAGE 117 V. A.C.
94 WATTS.

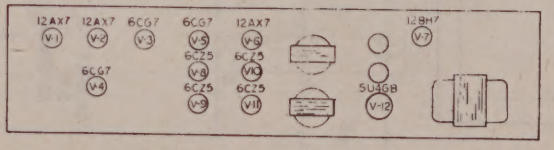
MAGNAVOX

MODEL— CR193

Schematic Diagram Courtesy of THE MAGNAVOX CO.



V1, V2, V6, 12AX7 ECC83
V3, V4, V5, 6CG7
V7.....12BH7
V8, V9, V10, V11 6CZ5(6973)
V12.....5U4GB(5AS4)



NOTES
VOLTAGES READ WITH A VTVM TO GROUND
NO SIGNAL, ALL CONTROLS OFF.
▲ = VARISTOR

MAGNATONE INSTURMENT AMPLIFIER
MODEL 280-A

Schematic Diagram Courtesy of MAGNA ELECTRONICS CO, INC.

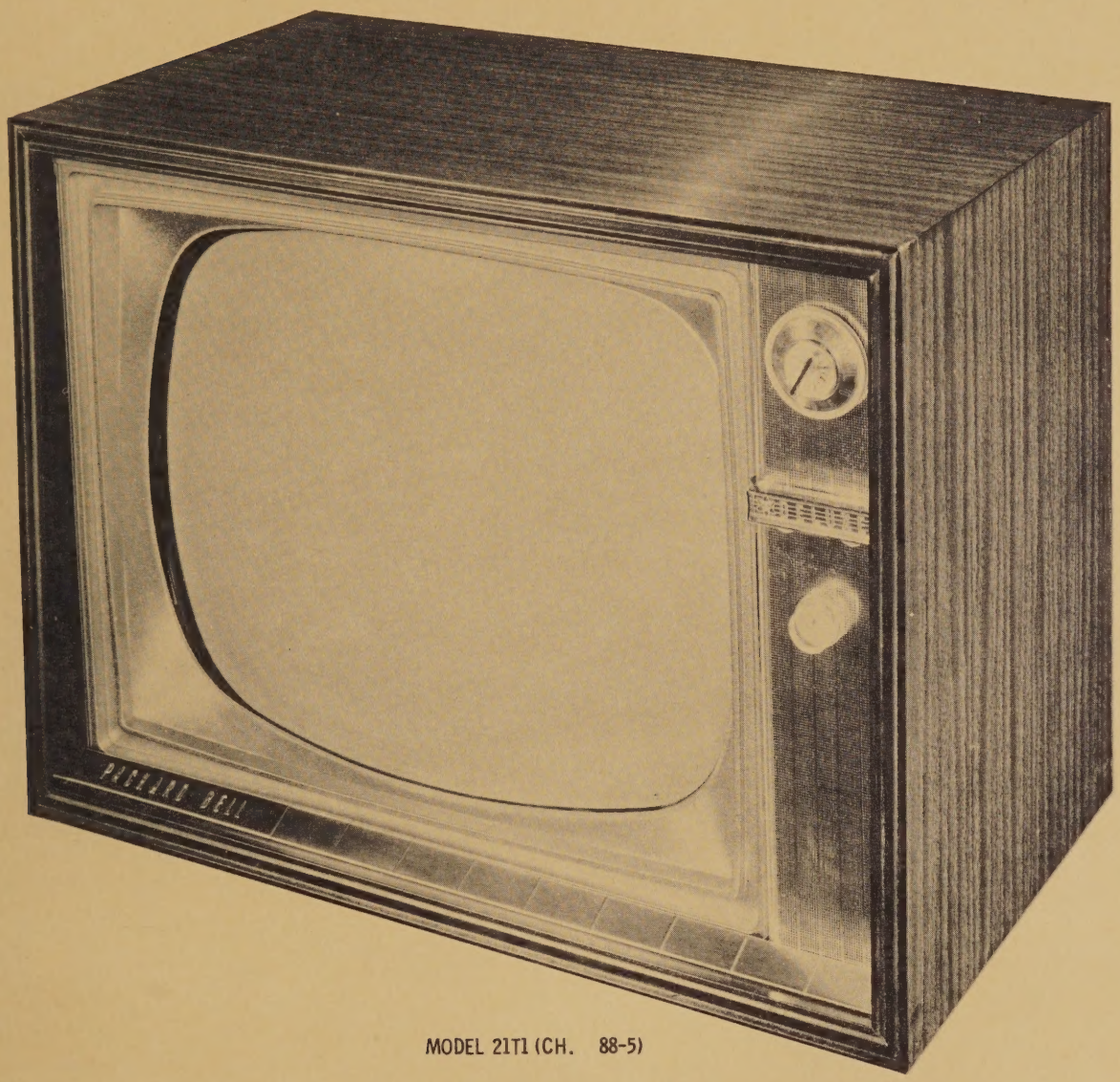
PHOTOFACT* Folder

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

PACKARD-BELL MODELS 21C1, 21C2,
21T1, 24C1 (Ch. 88-5)



MODEL 21T1 (CH. 88-5)

PACKARD-BELL MODELS 21C1, 21C2,
21T1, 24C1 (Ch. 88-5)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

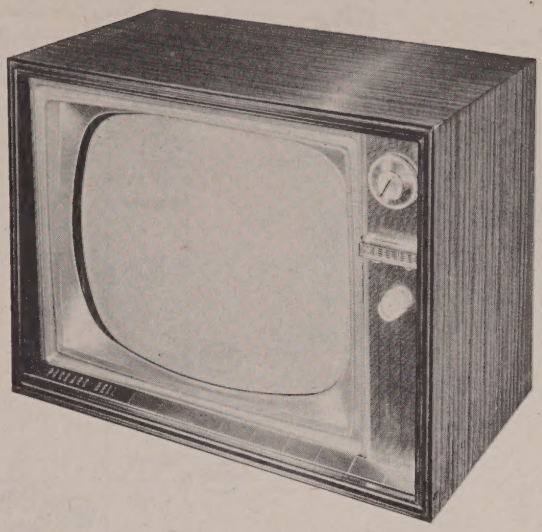
SET 426 FOLDER 1

PACKARD-BELL MODELS 21C1, 21C2, 21T1, 24C1 (Ch. 88-5)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove metal panel covering Brightness and Vertical Hold knobs by sliding upward.
2. Remove 6 push-on type knobs from front.
3. Remove 6 wood screws holding rear cover. Remove rear cover.
4. Remove speaker leads and pilot light.
5. Remove 4 bottom chassis bolts.
6. Remove 1 metal screw holding tuner bracket. Remove tuner by sliding upward.
7. Remove 1 metal screw holding top chassis brace.
8. Remove chassis.



MODEL 21T1 (Ch. 88-5)

TRADE NAME	Packard-Bell MODELS 21C1, 21C2, 21T1, 24C1 CHASSIS 88-5
MANUFACTURER	Packard-Bell Co.-Service Div., 11th & Hope Streets, Los Angeles 15, Calif.
TYPE SET	Television Receiver
TUBES	Eighteen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 225 Watts, 2.03 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. The adjustments are accessible, one at a time, as the Channel Selector is rotated. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Press bottom center of safety glass back firmly.
Insert a business card between safety glass and metal trim (left of center).
Slide card to right to depress spring. Lift metal trim at bottom straight up.

SPECIAL ADJUSTMENTS

A. AGC
Observe the picture and advance the AGC control to a point where the picture distorts or a buzz is heard in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

B. Focus
The focus may be varied by means of a Focus control. (For location, see tube placement chart.)

C. Pix Lock
Adjust picture to lock in with hold controls. If picture jitters, tears, etc. adjust Pix Lock until stable. Readjust the hold controls and check operation on all channels in the area.

D. Width
The width may be varied by removing R88 (33K 2W) from the screen grid (pin 8) of Horizontal Output tube (V12) to ground.

FUSE

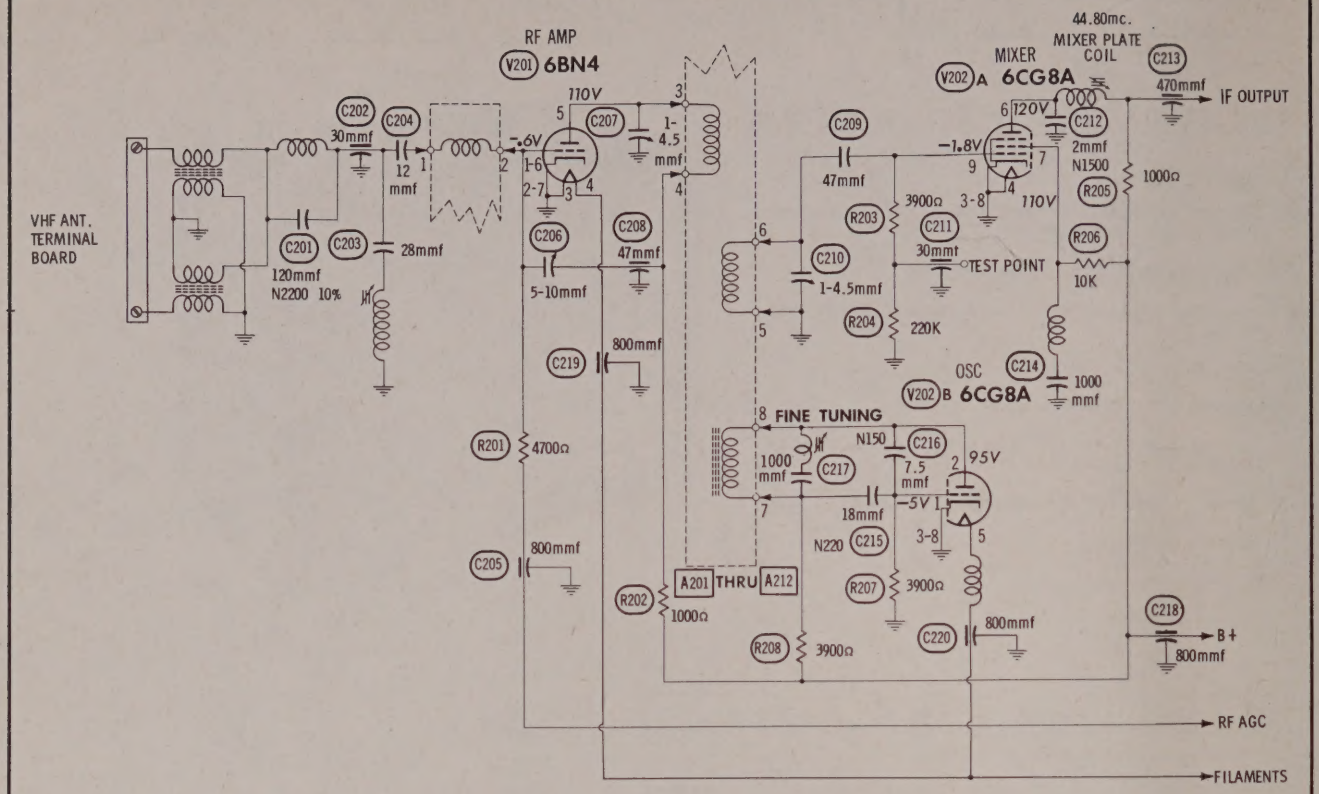
One fuse is used for low voltage power supply protection and a fuse wire for filament protection.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture. Rotate the two rings around the neck of the tube until the picture is properly centered.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

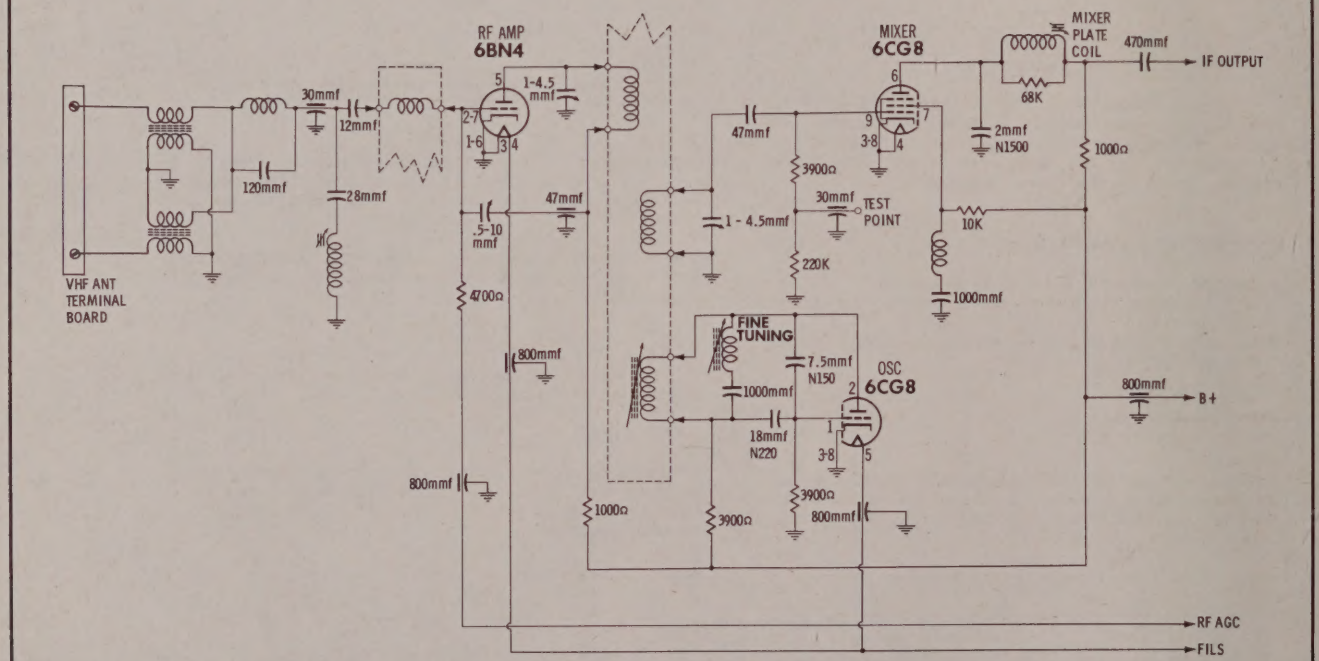
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

VHF TUNER 10591E

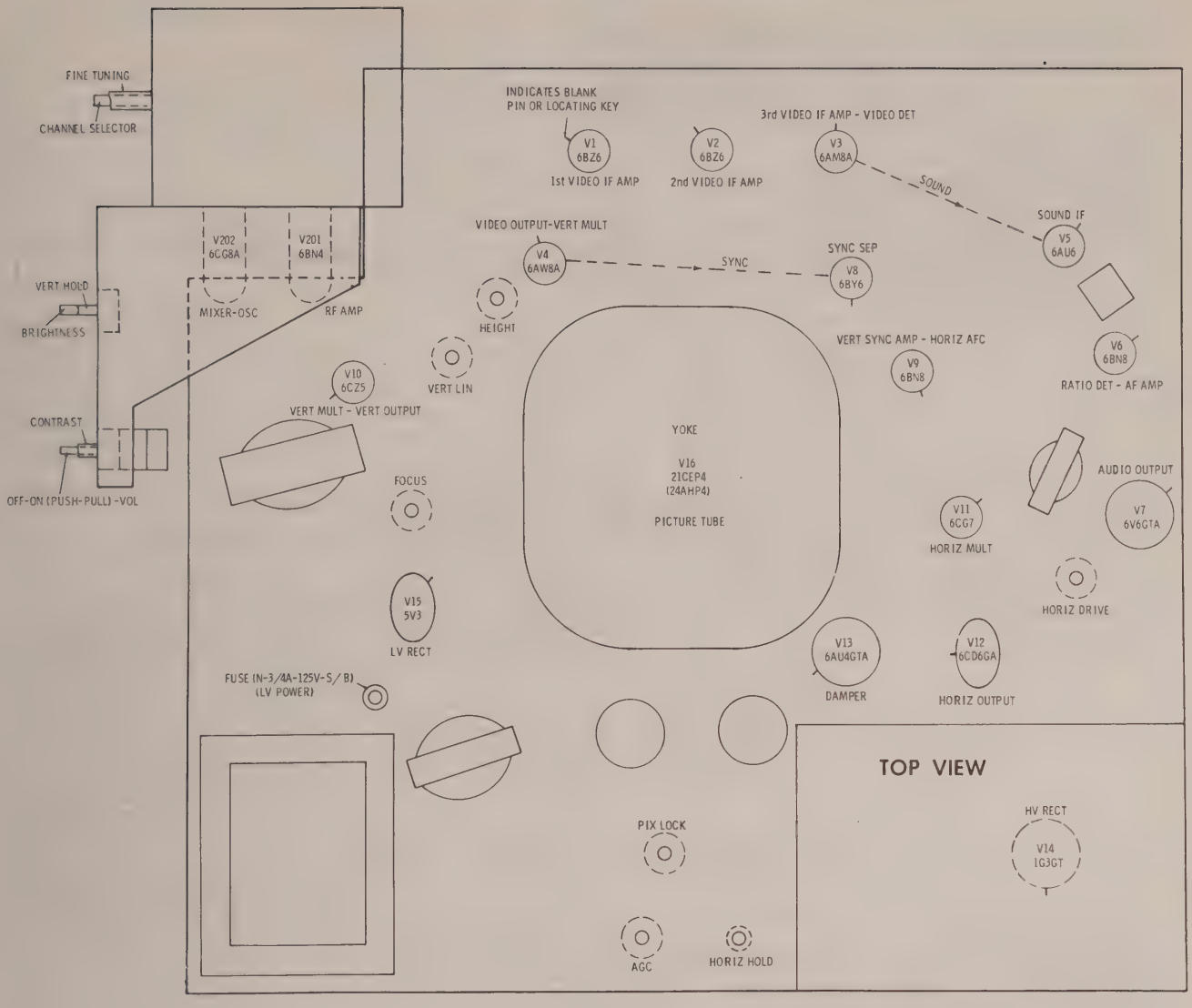


A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

VHF TUNER 10616A

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound Fuse (3/4A), Fuse Wire (Fil), V15

SWEEP FAILURE
No raster, has sound V9, V11, V12, V13, V14, V16
No vertical deflection V4, V10
Poor vert. linearity or foldover V4, V10
Poor horiz. linearity or foldover V11, V12, V13
Narrow picture V11, V12, V13, V15
Vert. off freq. V4, V10
Horiz. off freq. V11

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V16
Has pic, no sound V5, V6, V7

SYNC FAILURE
No vert. sync V8, V9
No horiz. sync V8, V9
No vert. or horiz. sync V8, V9

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: A1 thru A6 ..... General Cement #5003, 8721, 8722
Walsco #2512, 2519, 2525
A7, A8 ..... General Cement #8606, 8606L, 8282, 9295
Walsco #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Set signal generator output to obtain 3 to 4 volts on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis.	44.8MC (Unmod)	Any non-interfering channel	DC probe to point (A). Common to chassis. (Across Video Det. load)	Mixer Plate Coil	Adjust for maximum deflection.
2.	"	"	42.5MC	"	"	A1	"
3.	"	"	45.0MC	"	"	A2	"
4.	"	"	43.25MC	"	"	A3	"
5.	"	"	44.0MC	"	"	A4	Adjust for maximum deflection. Repeat steps 1 thru 5.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use a separate marker generator and connect the high side to the ground connection of the tuner output cable. Leave low side disconnected.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each side.	63MC (10MC Swp)	Not used	3	USE VTVM DC probe to point (B). Common to chassis.	AGC Control (R6)	Adjust sweep generator output to produce -4 volts AGC at point (B). Adjust AGC control (R6) so that voltage at points B & (C) are the same. If necessary, readjust sweep output so that the AGC voltage is again -4 volts.
7.	"	"	"	41.25MC 43.3MC 45.0MC 45.75MC	"	Vert. Amp. thru 22K to point (A). Low side to chassis. (Across Video Det. load)	Mixer Plate Coil, A1, A2, A3, A4	Check for response similar to Fig. 1 with markers as indicated. Retouch A1 for overall bandwidth, Mixer Plate Coil to place 45.75MC marker at 50% on curve, A2 for correct position of 45.0MC marker, A3 to place 41.25MC marker and to correct bottom portion of response curve, and A4 to control shape of curve on low side. Note position of 45.0MC marker on response curve. It must not exeed 97% on channel 3 or a smeared picture may result on higher channels.

4.5MC TRAP ALIGNMENT

Turn Contrast control fully clockwise.
If a 4.5MC signal generator of crystal accuracy capable of at least one volt output is not available, tune in a TV station and adjust A5 for MINIMUM 4.5MC beat interference in the picture.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.01mfd	High side to point (A). Low side to chassis. (Across Video Det. load)	4.5MC (Unmod)	Any non-interfering channel	RF probe to point (D). Common to chassis.	A5	Adjust for MINIMUM deflection with 1 volt or more input.

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.01mfd	High side to point (A). Low side to chassis. (Across Video Det. load)	4.5MC (Unmod)	Any non-interfering channel	DC probe to point (E). Common to chassis.	A6, A7	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point (F). Common to point (G).	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

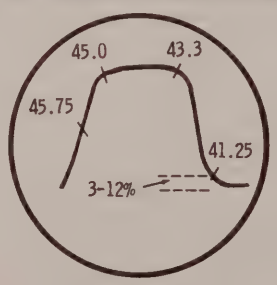


FIG.1

TUNER PARTS LIST AND DESCRIPTIONS

10591E

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BN4	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6CG8A	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	Packard-Bell PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	120								N2200 10%
C202	30								
C203	28								
C204	12								
C205	800			EF-001	MFT-1000			503C-D1	
C206	5-10								
C207	1-4.5				829-4		CT-551		
C208	47								
C209	47								
C210	1-4.5				829-4		CT-551		
C211	30								
C212	2								N1500
C213	470			BPD-00047	DD-471	L10T47	B-347	5GA-T47	
C214	1000			BPD-001	DD-102	L10D1	B-210	5HK-D1	
C215	18								N220
C216	7.5								N150
C217	1000			BPD-001	DD-102	L10D1	B-210	5HK-D1	
C218	800			EF-001	MFT-1000			503C-D1	
C219	800			EF-001	MFT-1000			503C-D1	
C220	800			EF-001	MFT-1000			503C-D1	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

TEM No.	RATING		Packard-Bell PART No.	NOTES
	OHMS	WATT		
R201	4700Ω			
R202	1000Ω			
R203	3900Ω			
R204	220K			

ITEM No.	RATING		Packard-Bell PART No.	NOTES
	OHMS	WATT		
R205	1000Ω			
R206	10K			
R207	3900Ω			
R208	3900Ω			

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools .....General Cement #8274, 8275, 8282, 8607, 8728, 8987, 9087, 9089, 9291
Walsco #2520, 2522, 2523, 2528, 2531, 2532, 2534, 2537, 2541

OSCILLATOR ALIGNMENT

Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Detector load.	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A202	
			201MC	199.25MC 203.75MC	11		A203	
			195MC	193.25MC 197.75MC	10		A204	
			189MC	187.25MC 191.75MC	9		A205	
			183MC	181.25MC 185.75MC	8		A206	
			177MC	175.25MC 179.75MC	7		A207	
			85MC	83.25MC 87.75MC	6		A208	
			79MC	77.25MC 81.75MC	5		A209	
			69MC	67.25MC 71.75MC	4		A210	
			63MC	61.25MC 65.75 MC	3		A211	
			57MC	55.25MC 59.75MC	2		A212	

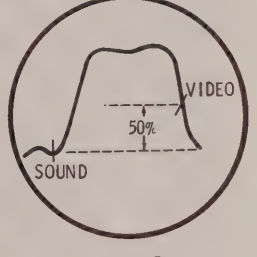


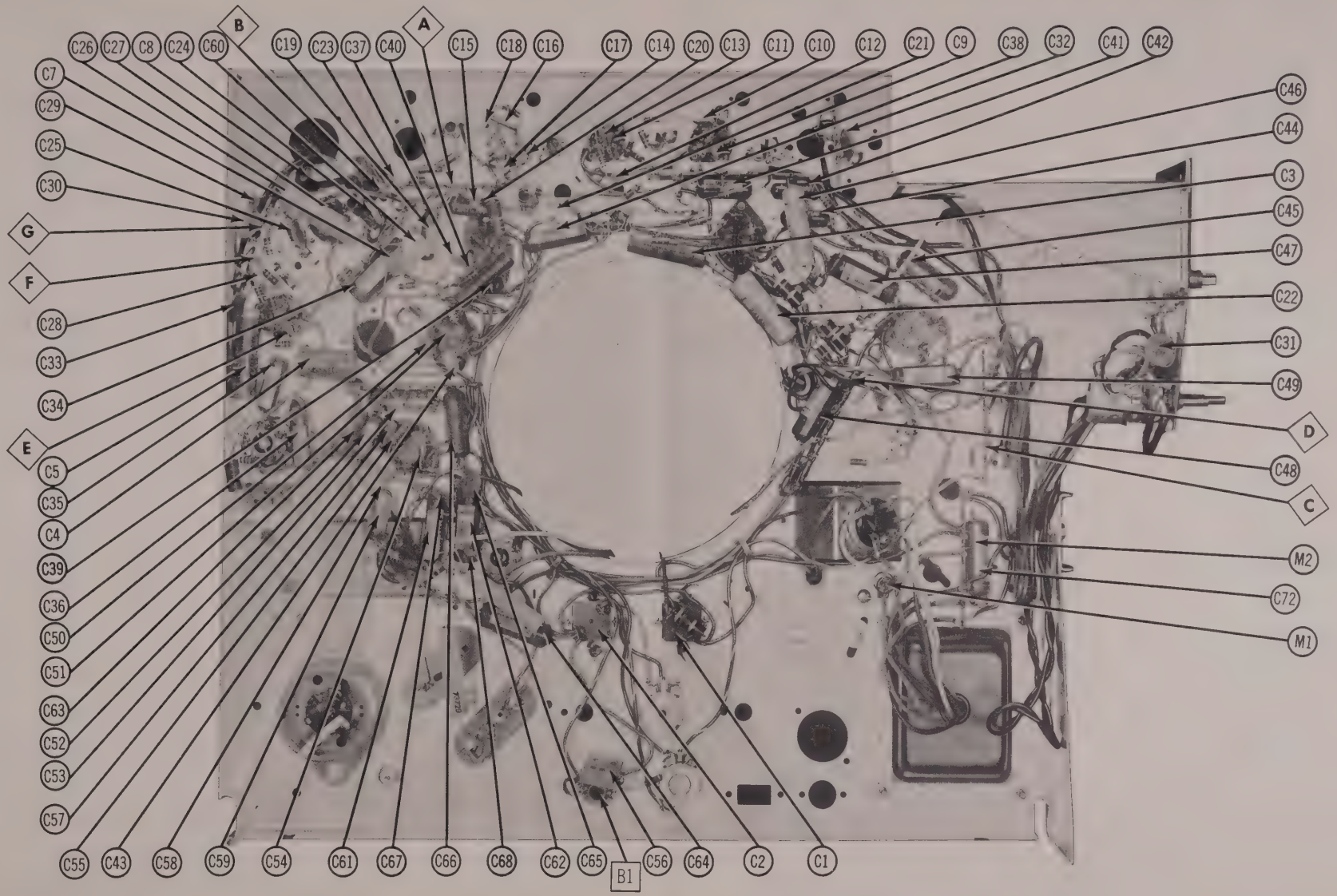
FIG. 201

RF AND MIXER ALIGNMENT

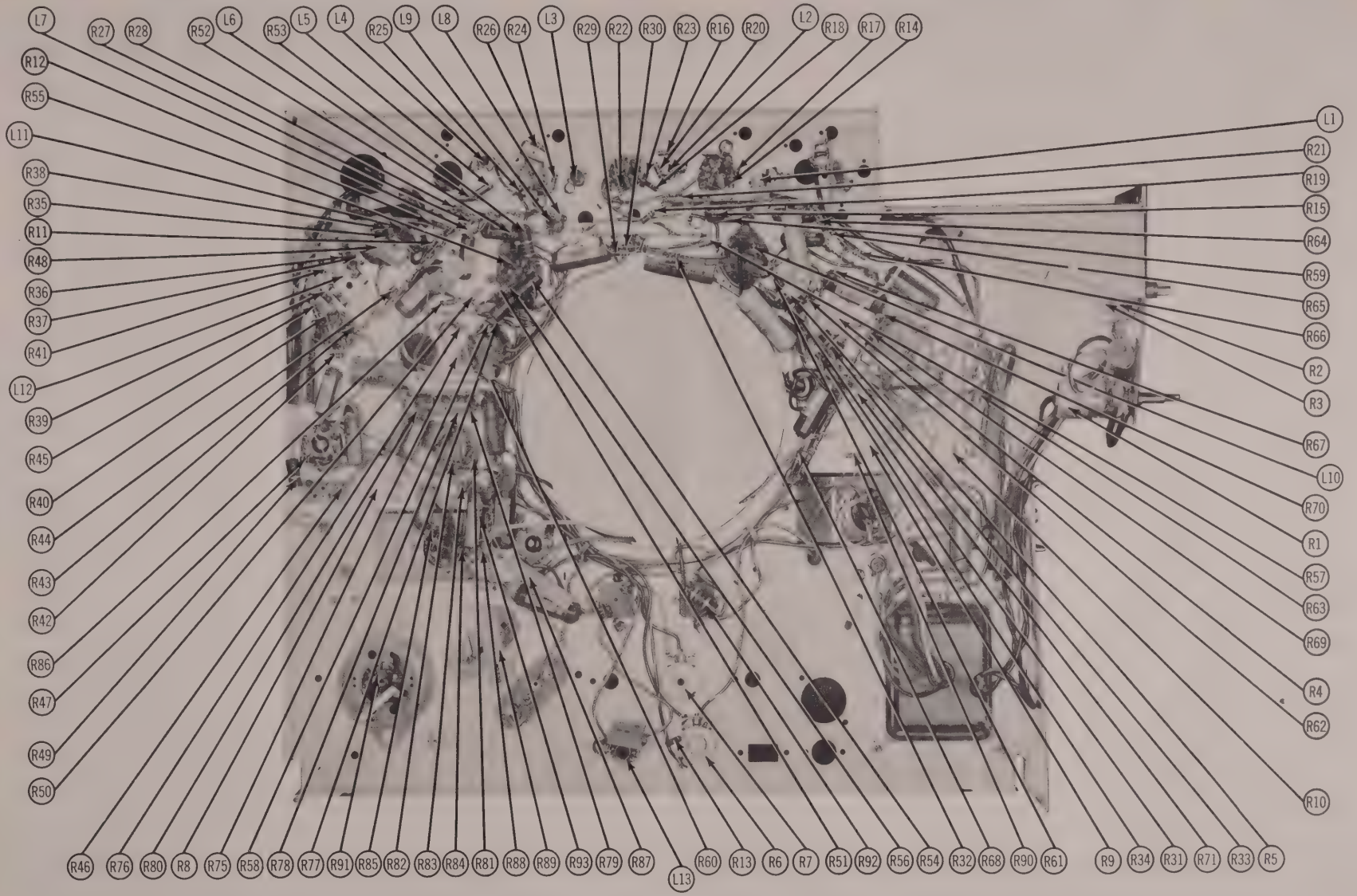
This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

UHF ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp.	6BZ6	
V2	2nd Video IF Amp.	6BZ6	
V3	3rd Video IF Amp. - Video Det	6AM8A	
V4	Video Output-Vert. Mult.	6AW8A	
V5	Sound IF Amp.	6AU6	
V6	Ratio Det.-AF Amp.	6HN8	
V7	Audio Output	6V6GTA	
V8	Sync Sep.	6BY6	
V9	Vert. Sync Amp. - Horiz. AFC	6BN8	
V10	Vert. Mult. - Vert. Output	6CZ5	
V11	Horiz. Mult.	6CU7	
V12	Horiz. Output	6CD6GA	
V13	Damper	6AU4GTA	
V14	HV Rect.	1G3GT	
V15	LV Rect.	5V3	

PICTURE TUBE

ITEM No	REPLACEMENT DATA: Packard-Bell PART No	GENERAL ELECTRIC PART No	RCA PART No.	SYLVANIA PART No.	NOTES
V16	21CEP4 24AHP4		21CEP4 ① 24AHP4 ②	21CEP4 ② 24AHP4 ③	① "Silverama" ② ② "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP.	VOLT	REPLACEMENT DATA: Packard-Bell PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No	SANGAMO PART No.	SPRAGUE PART No.
C1A	100	350	24166	AFH3-41-50	B0332	FP227.7	TMS-51	*	TVL-2641
B	100	350					TD-100-450		
C2A	140	350	24158	AFH3-29-75	D0044	FP228.3	TMS-52	S-232	TVLS-2642*
B	120	350					TD-20-350	MT-4520	
C3	25	25	24006A	PRS25V25	BBR25-25	TC36	TD-25-25	MT-0225	TVA-1205
C4	5	50	24039	PRS50V5	BBR5-50	TT50X5	TD-5-50	MMT-0505	TVA-1303
C5	25	25	24006A	PRS25V25	BBR25-25	TC36	TD-25-25	MT-0225	TVA-1205

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING: CAP.	VOLT	REPLACEMENT DATA: Packard-Bell PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C6	.1	200	23107	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C7	5000		23931	BPD-005	DD-502	L10D5	B-250	5GA-D5	
C8	.22	200	23109	P288N-22		CUB2P22	GEM-2022	2TM-P22	
C9	1000		23860	BPD-001	DD-102	BYA5DI	B-210	5GA-DI	
C10	1000		23860	BPD-001	DD-102	BYA5DI	B-210	5GA-DI	
C11	1000		23860	BPD-001	DD-102	BYA5DI	B-210	5GA-DI	
C12	1000		23860	BPD-001	DD-102	BYA5DI	B-210	5GA-DI	
C13	1000		23860	BPD-001	DD-102	BYA5DI	B-210	5GA-DI	
C14	1000		23963				JL-210	5GA-DI510%*	10%
C15	1000		23860	BPD-001	DD-102	BYA5DI	B-210	5GA-DI	
C16	10000		23939	BPD-01	DD-103	BYA10DI	B-110	5GA-SI	
C17	1000		23860	BPD-001	DD-102	BYA5DI	B-210	5GA-DI	
C18	5		23906	SI 5	DS-050	LT6V5	ZT-555	5GA-V5	
C19	.022	200	23103	P288N-022		CUB2S22	GEM-4122	2TM-S22	
C20	.047	200	23105	P288N-047		CUB2S47	GEM-4147	2TM-S47	
C21	10		23636		TCZ-10		ZT-541	5TCC-Q5S 5%*	NPO 5%
C22	.1	600	23145	P288N-1	DF-104	CUB6P1	GEM-501	6TM-P1	
C23	10		23636		TCZ-10		ZT-541	5TCC-Q5S 5%*	NPO 5%
C24	75			N750-DI 75	DTN-75	C10Q75U	ZT-5475	5TCU-Q75S 10% *	N750 10%
C25	10000		23939	BPD-01	DD-103	BYA10SI	B-110	5GA-SI	
C26	1500		23639	DI-1500			JL-215	5GA-DI5S 10%*	10%
C27	10000		23939	BPD-01	DD-103	BYA10SI	B-110	5GA-SI	
C28	1200		23889	DI-1200			JL-212	5GA-DI2S 10% *	10%
C29	2000		23974	DI-2000	DD-202	L10D2	B-220	5GA-D2	
C30	10000		23939	BPD-01	DD-103	BYA10SI	B-110	5GA-SI	
C31	10000		23939	BPD-01	DD-103	BYA10SI	B-110	5GA-SI	
C32	10000		23939	BPD-01	DD-103	BYA10SI	B-110	5GA-SI	
C33	10000		23939	BPD-01	DD-103	BYA10SI	B-110	5GA-SI	
C34	.1	600	23145	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C35	.022	400	23123	P488N-022	DD-203	CUB4S22	GEM-4123	4TM-S22	
C36	.01	600	23139	P688N-01	DD-103	CUB6SI	GEM-611	6TM-SI	
C37	220		23915	DI-220	DD-221	L10T22	B-322	5GA-T22	
C38	.1	200	23107	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C39	.0033	600	23117	P688N-0033	DF-303	CUB4D33	GEM-6233	4TM-D33	
C40	220		23915	DI-220	DD-221	L10T22	B-322	5GA-T22	
C41	.01	600	23139	P688N-01	DD-103	CUB6SI	GEM-611	6TM-SI	
C42	.001	600	23233		DD-102		GEM-1621	6TM-D1S 10% *	10%
C43	47		23833	NPO-DI 47	DTZ-47	C10Q47U	CNO-447	5TCC-Q47S 10% *	NPO 10%
C44	.0047	600	23237				GEM-16247	6TM-D47S 10%*	10%
C45	.033	600	23143	P688N-033	DD-333	CUB6S33	GEM-6133	6TM-S33	
C46	.047	600	23143	P688N-047	DD-473	CUB6S47	GEM-6147	6TM-S47	
C47	.1	600	23145	P688N-1	DF-104	CUB6P1	GEM-501	5TM-P1	
C48	.1	900	23145	P988N-1	DF-104	CUB9P1	GEM-901	9TM-P1	
C49	.1	200	23145	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C50	68		23992		DTZ-68		CNO-468	5TCC-Q68S 5% *	NPO 5%
C51	68		23992		DTZ-68		CNO-468	5TCC-Q68S 5%*	NPO 5%
C52	.0047	600	23137	P688N-0047	DD-472	CUB6D47	GEM-6247	6TM-D47	
C53	.15	200	23108	P288N-15		CUB2P15	GEM-2015	2TM-P15	
C54	1000		23983	BPD-001			JL-210	5GA-DI5 10% *	
C55	91		23819						NPO 5%
C56	4000		23308	1R5D4		MCB463	MS-34	MS-34	10%
C57	470		23336	1489-00047			MS-347	MS-347	5%
C58	330		23321	1489-00033			MS-333	MS-333	10%
C59	.022	600	23141	P688N-022	DD-223		CUB6S22	GEM-6122	6TM-S22
C60	5000		23931	BPD-005	DD-502	BYA5DI	B-250	5GA-D5	
C61	.1	200	23107	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C62	.1	600	23145					6TM-P1S 10% *	10%
C63	.0022	600	23316					6TM-D22S 10% *	10%
C64	.1	600	23145	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C65	10000		23939	BPD-01	DD-103	BYA10SI	B-110	5GA-SI	
C66	.033	1000	23074	P1088N-033	DD-333	CUB10S33	GEM-10133	10TM-S35	
C67	200	2500	23988		DD30-201	HVB30T2		30GA-T2	
C68	200	2500	23988		DD30-201	HVB30T2		30GA-T2	
C69	100	2000		HVD-30-100		HVB20T12	2EV-310	30GA-T1	
C70	120	2000		HVD-30-120		HVB20T12	2EV-312	30GA-T12	
C71	120	2000		HVD-30-120		HVB20T12	2EV-312	30GA-T12	
C72	.1	600	23745	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C73	68				DTZ-68		CNO-468	5TCC-Q68S 5%*	NPO 5% ①

* Not normally in distributors stock. Available through distributor on order to manufacturer.
① Chassis using Tuner #10616A use 82mmf 5% in this application (Part #23638).

CONTROLS

ITEM No	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: Packard-Bell PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1500Ω	½	25964				UE161-S	Contrast
B	500K	½					Not Req.	Volume
C	Switch						Not Req.	Push-Pull Type
R2A	50K	½	25952	B-31	A47-50K-S	QU-123	U36	Bright
B	Shaft			Not Req.	KS8-3	Not Req.	Not Req.	
R3A	3meg	½	25954	B-84	A47-3meg-S	QU-140	U59	Vert. Hold
B	Shaft			Not Req.	KS8-3	Not Req.	Not Req.	
R4A	3meg	½	25887	AB-84	B47-3meg-S	QU-140	TA36L	Vert. Linearity
B	Shaft			AK-1	Not Req.	Not Req.	Not Req.	
R5A	5meg	½	25910	AB-87	B47-5meg-S	QU-141	PTA86L	Height
B	Shaft			AK-1	Not Req.	Not Req.	Not Req.	
R6A	1meg	½	25915	BT-173	A47F5-1meg		UT-438	AGC, Tap ② 350K
B	Shaft			Not Req.	FKS-1/4		Not Req.	
R7A	7.5meg	½	25911	AB-98	B47-7.5meg -S	QU-142	PTA75L	Pix Lock
B	Shaft			AK-1	Not Req.	Not Req.	Not Req.	
R8A	50K	½	25908	AB-31	B47-50K-S	QU-123	PTA54L	Horiz. Drive
B	Shaft				Not Req.	Not Req.	Not Req.	
R9A	5meg	½	25910	AB-87	B47-5meg-S	QU-141	PTA86L	Focus
B	Shaft			AK-1	Not Req.	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING: OHMS	WATTS	Packard-Bell PART No	NOTES
R10	2.2meg		73165	
R11	56K		73046	
R12	2.2meg		73165	
R13	6.2meg		73072	
R14	10K		73037	
R15	1200		73014	
R16	470Ω		73021	
R17	56Ω		73010	
R18	12K		73038	
R19	120K		73050	
R20	6800Ω		73035	
R21	120K		73050	
R22	470Ω		73021	
R23	100Ω		73013	
R24	6800Ω		73035	
R25	1000Ω		73025	
R26	270Ω		73018	
R27	1500Ω		73027	
R28	18000Ω		73028	
R29	470K		73157	
R30	4700Ω		73033	
R31	4700Ω	2	73433	
R32	180Ω		73016	
R33	82K	2	73448	
R34	220K		73153	
R35	33K		73043	
R36	3300Ω		73031	
R37	15K		73039	
R38	120Ω		73014	
R39	12K		73038	
R40	12K		73038	
R41	39K		73044	
R42	4.7meg		73169	
R43	220K		73153	
R44	220K		73153	
R45	470Ω		73021	
R46	6800Ω		73035	
R47	470K		73157	
R48	3500Ω 5%	10	73733	
R49	560Ω	2	73422	
R50	39K		73044	
R51	150K		73151	
R52	560K		73058	
R53	8200Ω	2	73436	
R54	22K	5	73650	
R55	2.2meg		73165	
R56	470K		73157	
R57	22K		73041	
R58	39K		73044	
R59	22K		73041	
R60	10K		73037	
R61	2.2meg		73065	
R62	1meg		73181	
R63	3.3meg		73067	
R64	68K		73047	
R65	120K		73050	
R66	56K		73046	
R67	1meg		73181	
R68	4.7meg		73169	
R69	1.5meg		73163	
R70	470K		73157	
R71	4700Ω		73033	
R72	220Ω			
R73	2.2Ω Cold			
R74	220Ω			
R75	1meg		73061	
R76	1meg		73061	
R77	560Ω		73022	
R78	470K		73057	
R79	47K		73045	
R80	6800Ω		73035	
R81	1500Ω		73027	
R82	100K 5%		73049-1	
R83	150K		73051	
R84	820K		73060	
R85	820K		73060	
R86	220K		73153	
R87	12K	10	73705	
R88	33K	2	73443	Note 1
R89	6800Ω 5%	7	73729	
R90	1meg		73181	
R91	2.2Ω	1	73719	
R92	470Ω	2	73421	
R93	4700Ω		73033	

Note 1. Not used in some versions.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: Packard-Bell PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	1st Video IF	29584A	17-4534	TV-131		VF-4	
L2	2nd Video IF	29585	17-4523	TV-130	6219	VF-3	
L3	3rd Video IF	29586	17-4523	TV-130	6219	VF-3	
L4	4th Video IF	29587A	17-4523	TV-130	6219	VF-3	
L5	RF Choke	29566	19-1005	BC-566	4612		
L6	RF Choke	29566	19-1005	BC-566	4612		
L7	Series Peaking Coil	29908	19-4180	TV-183	6179	VP-5 *	180 Microhenries, wound on 39K resistor
L8	Series Peaking Coil	29852	19-3093 ▲	TV-181 ▲	6177 ▲	VP-3 ▲	93 Microhenries, wound on 3900Ω resistor
L9	4.5MC Trap	29548A			1470 •		
L10	Shunt Peaking Coil	29577	19-4400 ▲	TV-202 ▲	6136 ▲		400 Microhenries, wound on 18K resistor
L11	Sound IF	29053C		TV-119 •			
L12	Ratio Detector	29694	17-3477				

* Parallel with 39K resistor. ▲ Parallel with 3900Ω resistor. • Disregard tap. ▲ Parallel with 18K resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI	DC RES. SEC.	REPLACEMENT DATA: Packard-Bell PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	NOTES
L13	74Ω		29703		TV-165 ▲	6211 ▲	H-102		Horiz. Freq. ▲ Disregard tap.

FILTER CHOKE

ITEM No.	RATINGS: CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
L14	.280A	38Ω	9 Hy.	27006D	C5037 ①	C-2996 ①		C-2328 ①	26C44 ①	C-27X

TRANSFORMER (POWER)

ITEM No	RATING: PRI	SEC 1	SEC 2	REPLACEMENT DATA: Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V a 2.03A	580VCT a 280A	5V a 3.8A	89076		P-3055			26R92	
	SEC 3	SEC 4	SEC 5							
	6.3V a 10.5A									

① Drill new mounting hole.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Vert Output	89463			V-310		VO-101	26S14	A-113X ①
T3	Yoke-Horiz (15.6MH) (110°)-Vert. (15MH)	29696 ②			V-110 ③		DY-26A	Y-52	Y-60-2
	Rear Cover & Centering Device	34071							
	Alternate Rear Cover & Centering Device	34092							
T4	Horiz. Output	89488							

① Connect as autoformer.
② Includes C68, C70, C71, R72, R73 and R74.
③ Connect yoke terminal #2 to terminal #4 of T4, yoke terminal #3 to R63, yoke terminal #10 to junction of C66 and C67.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI	SEC	REPLACEMENT DATA: Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	4500Ω	3-4Ω	89436D	22107	A-2930	AU-601	A-3877	34S81	S-51X	

SPEAKER

ITEM No.	TYPE: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: Packard-Bell PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	83014 ①	4A07	① Used in Model 21T1
	6" x 9"	PM	3-4Ω	83112 ②	69A2	② Used in Models 21C1, 24C1
	4"	PM	6-8Ω	83017 ②	4A07Z8.3 ③	③ Two used in Model 21C2. Parallel and phase.

FUSES

ITEM No	TYPE	RATING	REPLACEMENT DATA: Packard-Bell PART No. FUSE	HOLDER	LITTELFUSE PART No. FUSE	HOLDER	BUSS FUSE	HOLDER
M1	N	3/4A 125V 8/B	45040		333.750 (N 3/4A-125V-8/B)	348010	N 3/4	HN 1/2 to 3/4
M2	1" Length #28 Wire							

MISCELLANEOUS

ITEM No.	PART NAME	Packard-Bell PART No.	NOTES
M3	Lamp	54002	#47, Not used in some versions
M4	Tuner	10616Z	VHF
	Tuner	10616A	VHF
	Tuner	10609	UHF-VHF

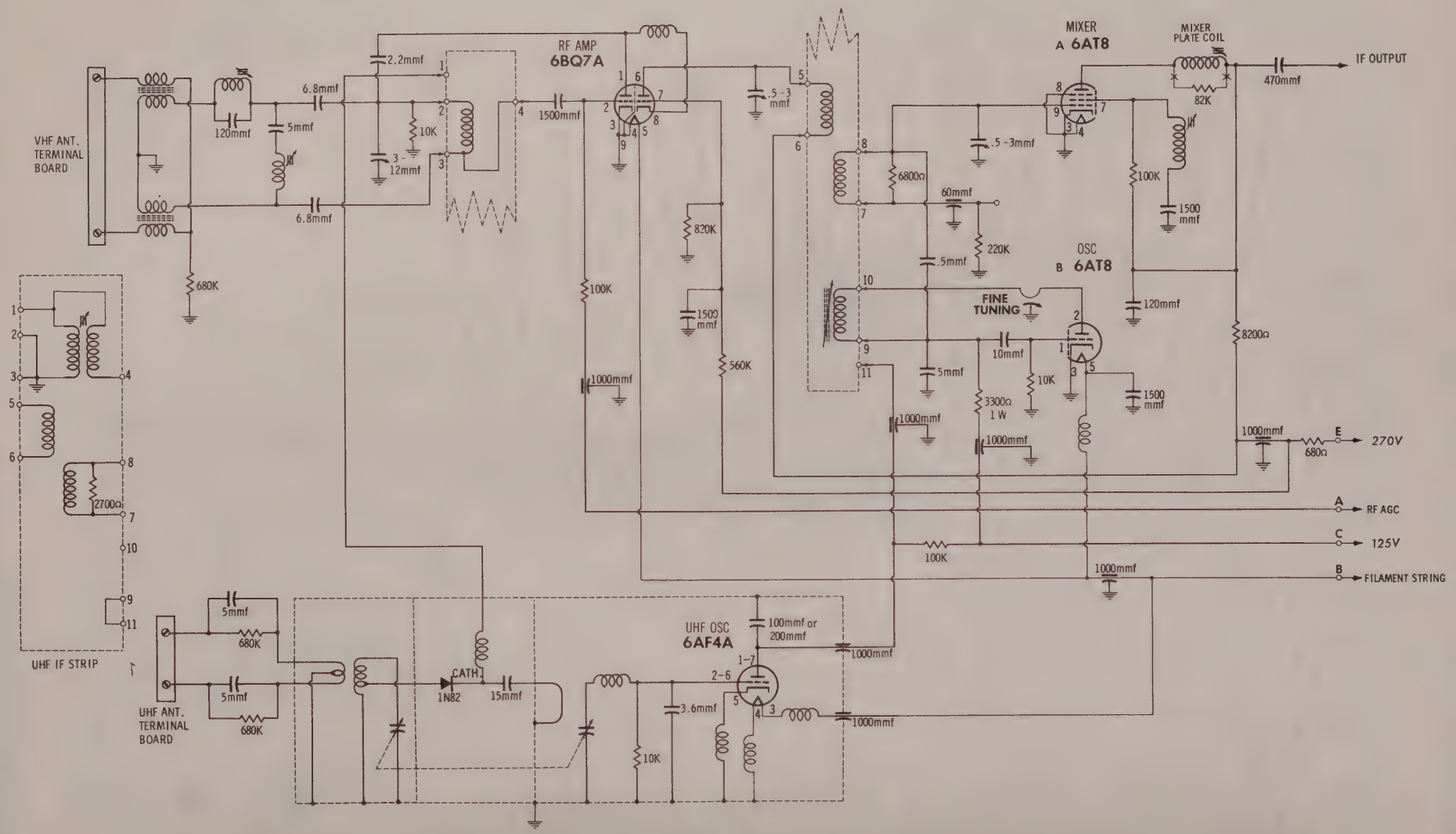
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	55090A	Models 21T1, 21C1, 21C2
Safety Glass	55096B	Model 24C1
Mask	55106A	Models 21T1, 21C1, 21C2
Mask	55107A	Model 24C1
Knob	52240	VHF Channel Selector, VHF Models
Knob	52224A	VHF Channel Selector, UHF Models
Knob	52225	UHF Channel Selector
Knob	52209A	VHF Fine Tuning, VHF Models
Knob	52223	VHF Fine Tuning, UHF Models
Knob	52211	Volume-On-Off
Knob	52213	Brightness, Vert. Hold
Knob	52248	Contrast
Knob	52183A	AGC

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8235
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8486 (Round) - 9 Conductor



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

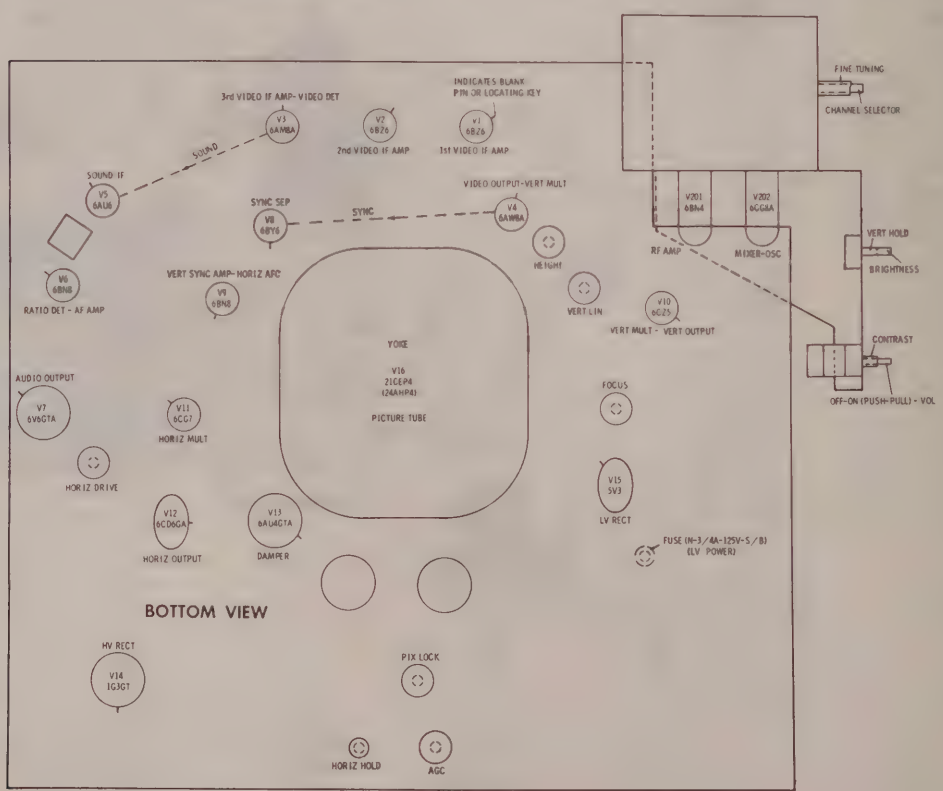
UHF-VHF TUNER 10609

CHASSIS TOP VIEW

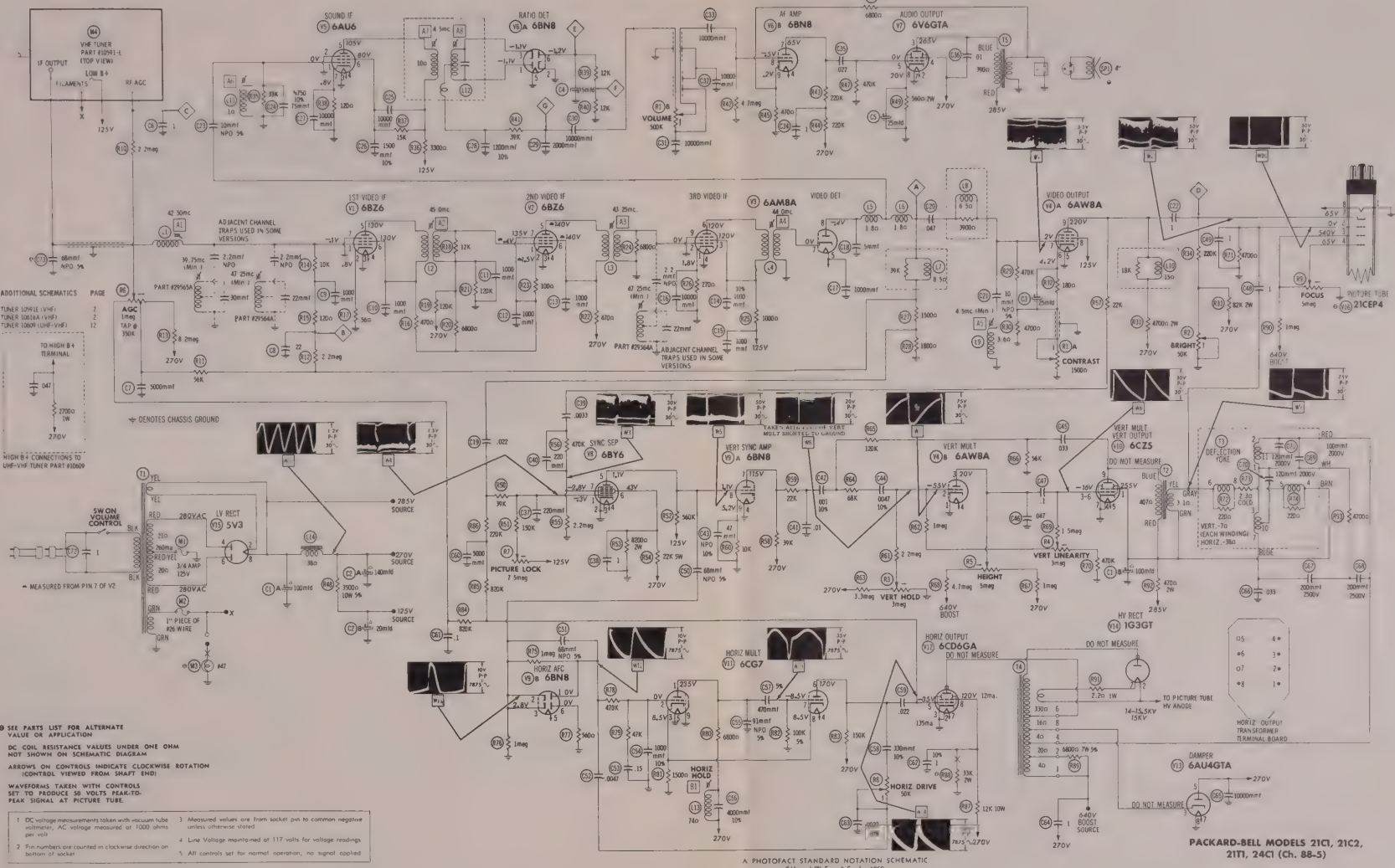
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	2.2meg	56Ω	0Ω	.1Ω	††470Ω	††470Ω	0Ω		
V2	6BZ6	††6800Ω	††100Ω	0Ω	.1Ω	†470Ω	†470Ω	70K		
V3	6AM8A	270Ω	.1Ω	†4500Ω	0Ω	.1Ω	†4500Ω	.1Ω	3300Ω	0Ω
V4	6AW8A	0Ω	●1.7meg	●†2.5meg	.1Ω	0Ω	● 280Ω	475K	†3500Ω	†4700Ω
V5	6AU6	1Ω	0Ω	0Ω	.1Ω	†6800Ω	†21K	120Ω		
V6	6BN8	INF	0Ω	INF	.1Ω	0Ω	24K	†440K	4.7meg	470Ω
V7	6V6GTA	TP	.1Ω	†428Ω	†0Ω	470K	TP	0Ω	560Ω	
V8	6BY6	1.2meg	0Ω	0Ω	.1Ω	†560K	†12K	2.2meg		
V9	6BN8	2meg	1meg	1meg	0Ω	.1Ω	560Ω	†39K	†560K	10K
V10	6CZ5	†510Ω	NC	2.3meg	0Ω	.1Ω	2.3meg	0Ω	NC	†920Ω
V11	6CG7	†6900Ω	2.5meg	1500Ω	.1Ω	0Ω	†150K	100K	1500Ω	0Ω
V12	6CD6GA	TP	0Ω	0Ω	NC	1meg	TP	.1Ω	†9000Ω	TOP CAP ǂ 16Ω
V13	6AU4GTA	NC	TP	¶3.5meg	NC	†0Ω	NC	.1Ω	0Ω	
V14	1G3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ǂ 346Ω
V15	5V3	NC	¶	NC	21Ω	NC	20Ω	NC	¶	
V16	21CEP4	0Ω	4700Ω	ǂ800K	ǂ3.5meg	NC	NC	● 230K	.1Ω	
V201	6BN4	0Ω	2.5meg	0Ω	.1Ω	†4500Ω	0Ω	2.5meg		
V202	6CG8A	3900Ω	†7400Ω	0Ω	0Ω	.1Ω	†4500Ω	†13K	0Ω	220K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 270V SOURCE.
†† MEASURED FROM PIN 7 OF V2. NC NO CONNECTION.
ǂ MEASURED FROM PIN 3 OF V13. TP TIE POINT.



TUBE PLACEMENT CHART



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.

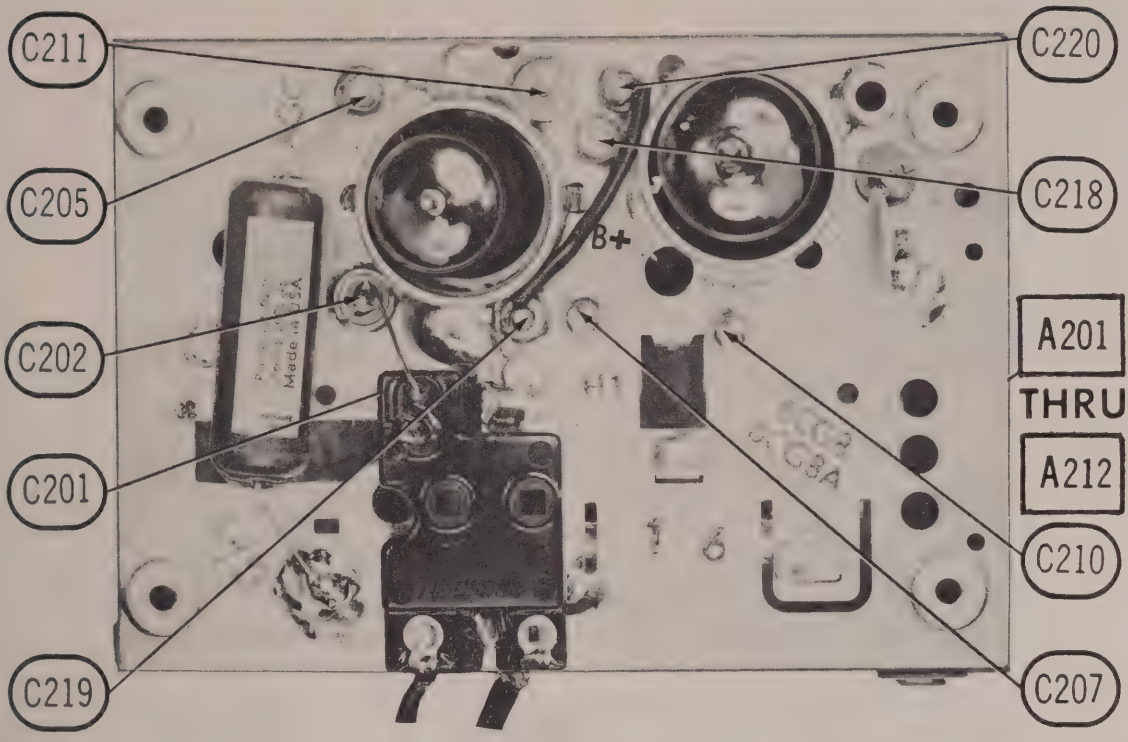
1 DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1000 ohms per volt

2 Pin numbers are counted in clockwise direction on bottom of socket

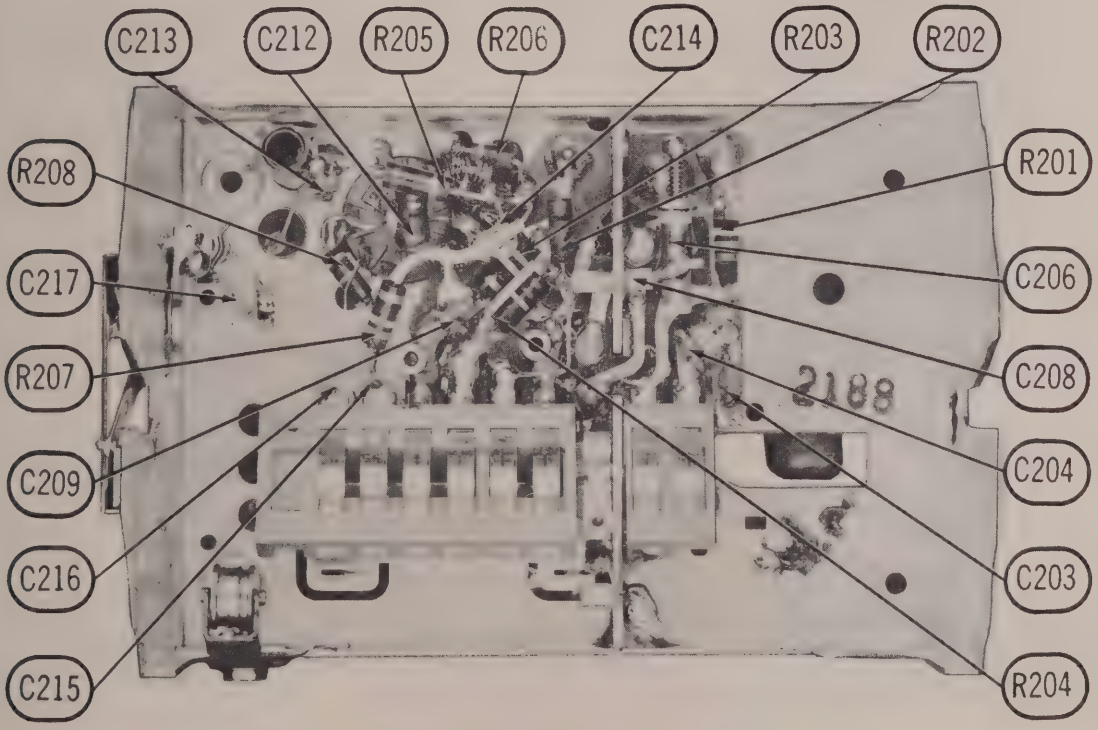
3 Measured values are from socket pin to common negative unless otherwise stated

4 Line Voltage maintained at 117 volts for voltage readings

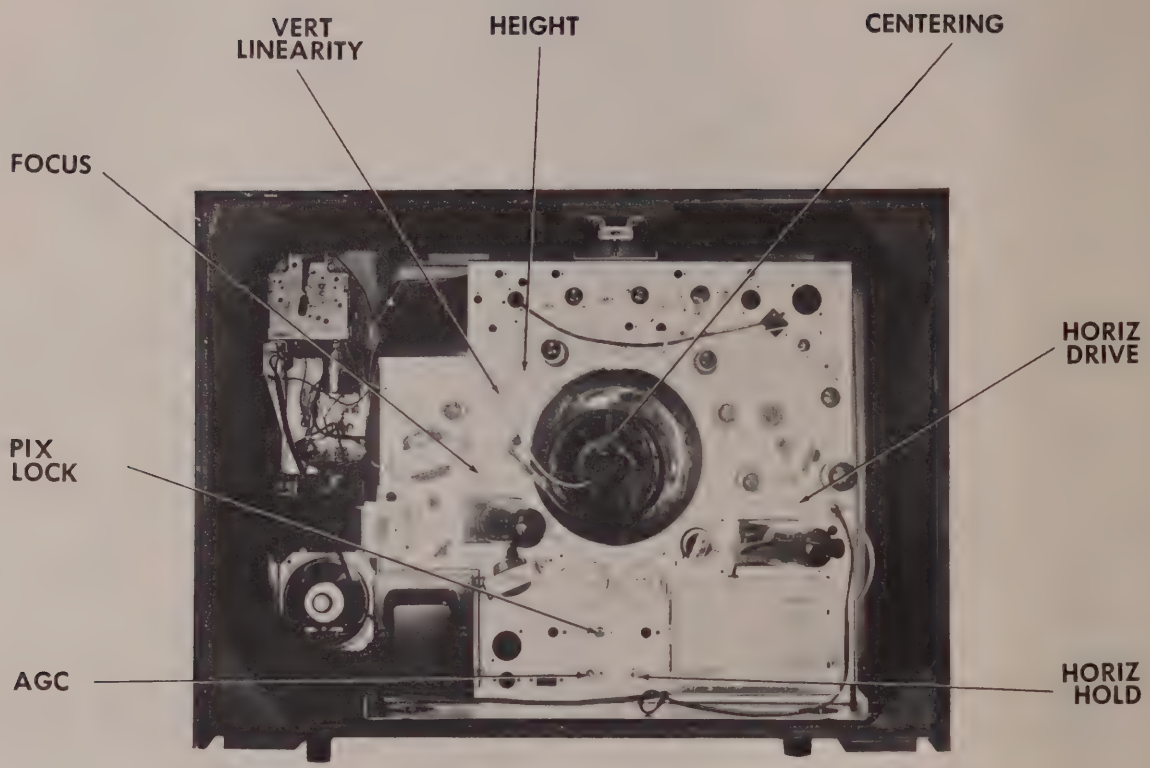
5 All controls set for normal operation, no signal applied



TUNER 10591E - TOP VIEW



TUNER 10591E - BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn set on and tune in a TV station, preferably with a test pattern.
2. Set the Brightness and Contrast controls for a normal picture.
3. Turn the Horizontal Hold clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.
4. Turn the Horizontal Hold slowly counterclockwise until the picture just falls into sync.
5. Turn to an unused channel. If vertical lines appear near the center of the screen, slowly adjust the Horizontal Drive control until white lines disappear.
6. If in step 5 the Horizontal Drive was adjusted, tune in a TV station and repeat steps 3 and 4. Check horizontal sync by switching off channel and back again.

PHOTOFACT* Folder

with CIRCUITRACE*

SILVERTONE CHASSIS 528.51360, 362, 363, 365, 366, 370, 372, 373, 380, 381, 382, 390, 391, 392, 440, 441, 450, 451

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

SILVERTONE CHASSIS 528.51360, 362, 363, 365, 366, 370, 372, 373, 380, 381, 382, 390, 391, 392, 440, 441, 450, 451

MODEL 9190 (CH. 528.51380)

SILVERTONE CHASSIS 528.51360, 362, 363, 365, 366, 370, 372, 373, 380, 381, 382, 390, 391, 392, 440, 441, 450, 451

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

SILVERTONE CHASSIS 528.51360, 362, 363, 365, 366, 370, 372, 373, 380, 381, 382, 390, 391, 392, 440, 441, 450, 451

SILVERTONE CHASSIS 528.51360, 362, 363, 365, 366, 370, 372, 373, 380, 381, 382, 390, 391, 392, 440, 441, 450, 451

MODEL 9180 (Ch. 528.51380)

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.

TRADE NAME	Silvertone	MODELS	CHASSIS	MODELS	CHASSIS
		9114, 9116, 9154, 9156, 9158, 9170, 9172..	528.51360	9191, 9193.....	528.51390
			528.51362		528.51391
			528.51363		528.51392
			528.51365	9130, 9132	528.51440
			528.51366		528.51441
		9115, 9116, 9155, 9157, 9159, 9171, 9173..	528.51370	9131, 9133.....	528.51450
			528.51372		528.51451
			528.51373	9190, 9191, 9192, 9193	528.56340*
		9190, 9192	528.51380		528.56350*
			528.51381	7777A.....Radio.....	528.53191
			528.51382		
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Avenue, Chicago, Illinois				
TYPE SET	Television Receiver With Phono				
TUBES	Fifteen				
POWER SUPPLY	110-120 Volts AC, 60 Cycle		RATING 150 Watts, 1.47 Amp. @ 117 Volts AC		
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)				

* RECORD CHANGER. FOR SERVICE INFORMATION SEE SIMILAR UNIT IN PHOTOFACT SET 417 FOLDER 10.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the rear cover, and supplying power to the receiver. Set the Fine Tuning at the center of its range. The adjustments (located in a circle around the shaft) should be made in sequence from the highest to the lowest channel in the area. Channel 13 adjustment is located at 4 o'clock, proceed in a counterclockwise direction adjusting for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Remove the upper trim strip by pulling off.
Slide the three glass retaining clips to the left.
Tilt safety glass forward and lift out.

SPECIAL ADJUSTMENTS

A. AGC
Observe the picture and advance the AGC control to a point where the picture distorts or a buzz is heard in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

B. Focus
The focus may be varied in steps by the position of a plug in the Focus Adjustment board.

C. Width
The width may be varied by means of a metallic sleeve located between the yoke and the picture tube neck. Adjust sleeve in or out of the yoke for a picture slightly larger than necessary to fill the screen.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The Horizontal Frequency coil is used as the Horizontal Hold control. Adjust the Horizontal Hold until the picture synchronizes horizontally. (For location, see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Ratio Detector secondary (A10) located on top of chassis.

FUSE DEVICE

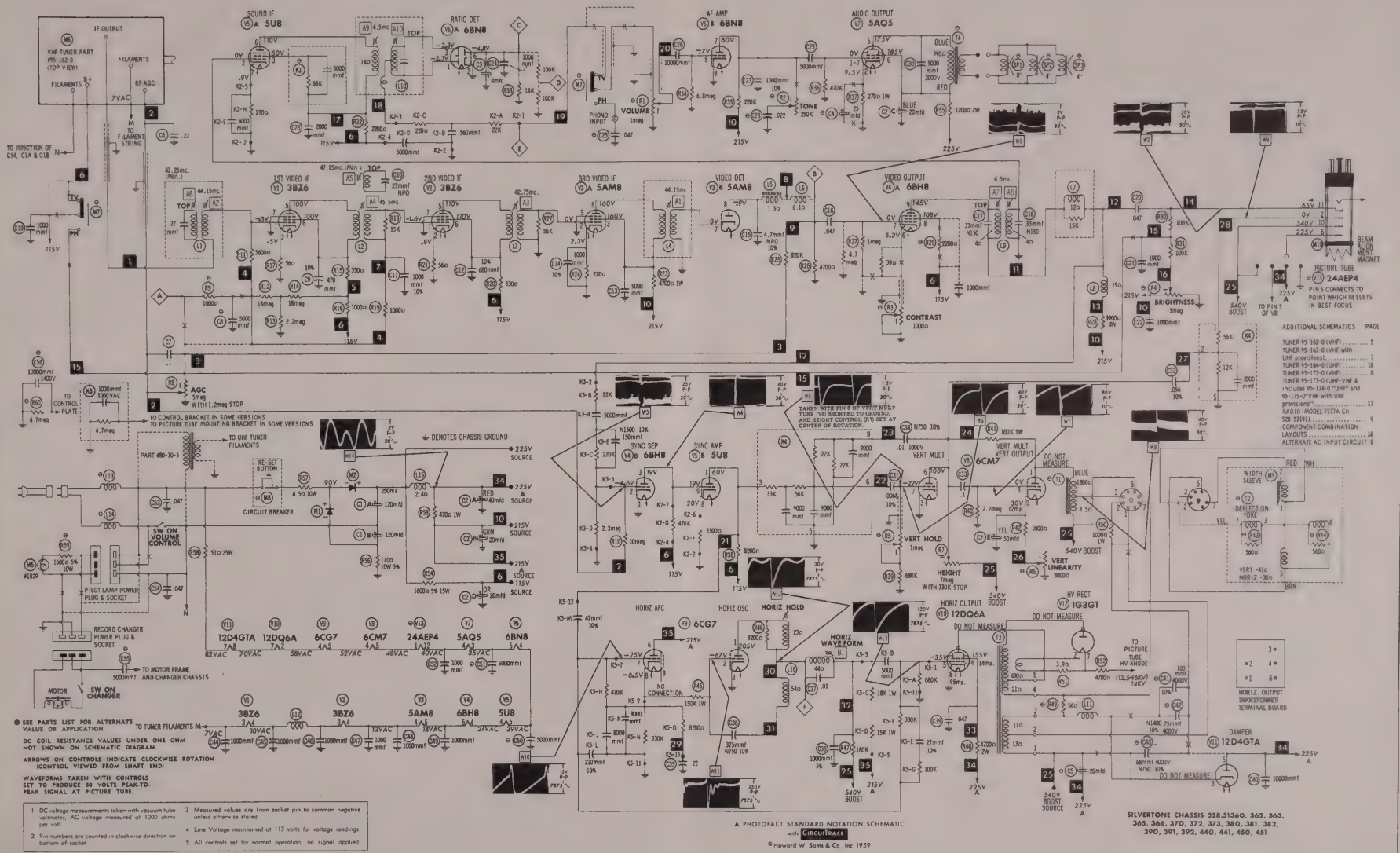
A Circuit Breaker is used for LV power supply protection, and may be reset by depressing the reset button. (For location, see tube placement chart.)

CENTERING

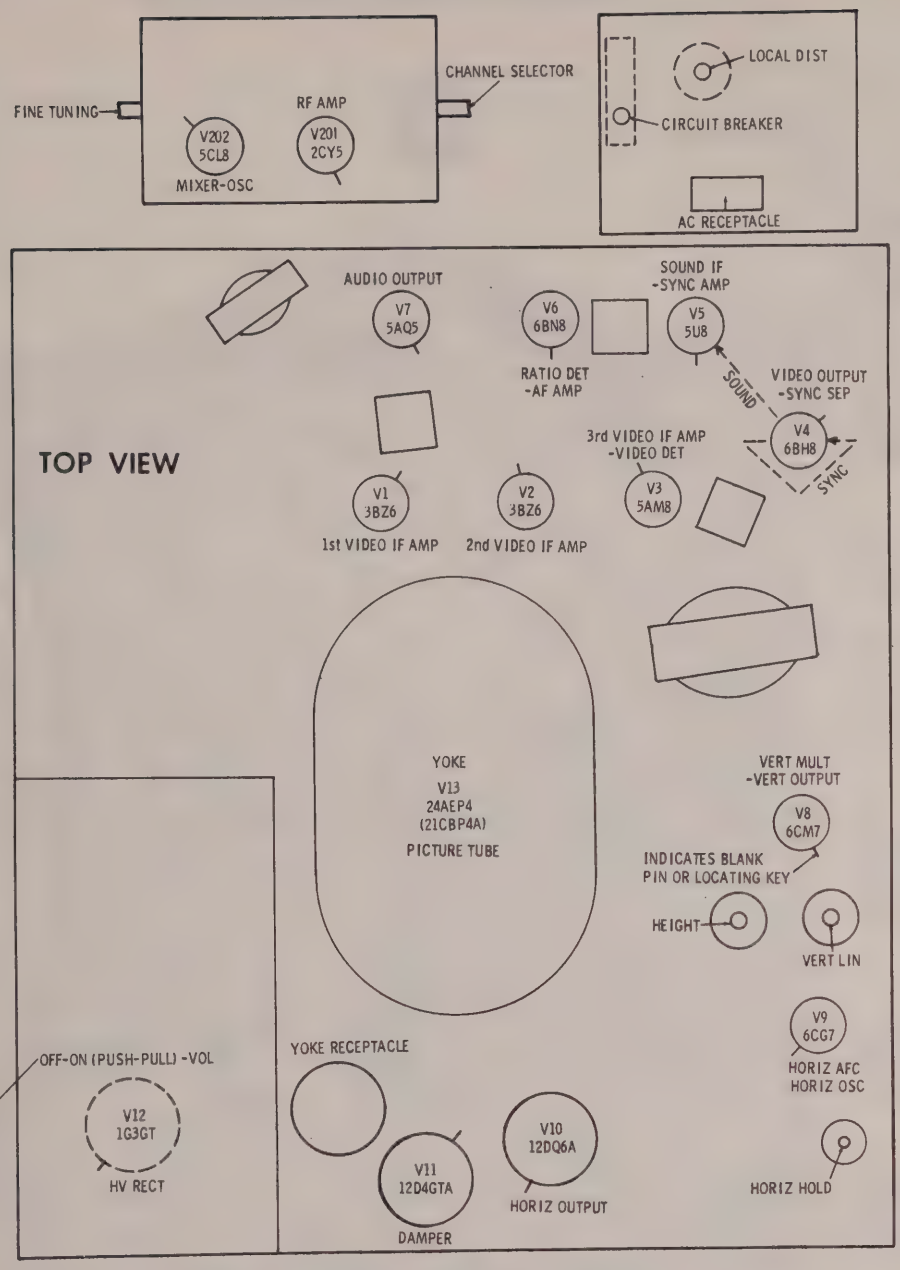
Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America


SOUND IF
RATIO DET
AF AMP
AUDIO OUTPUT
VOLUME
TONE
PHONO INPUT
1ST VIDEO IF
2ND VIDEO IF
3RD VIDEO IF
VIDEO DET
VIDEO OUTPUT
BRIGHTNESS
CONTRAST
PICTURE TUBE
24AEP4
AGC
SYNC SEP
SYNC AMP
VERT MULT
VERT OUTPUT
VERT HOLD
HEIGHT
VERT LINEARITY
HORIZ AFC
HORIZ OSC
HORIZ HOLD
HORIZ WAVE FORM
HORIZ OUTPUT
HV RECT
DAMPER
SW ON VOLUME CONTROL
CIRCUIT BREAKER
PILOT LAMP POWER PLUG & SOCKET
RECORD CHANGER POWER PLUG & SOCKET
SW ON CHANGER
TO MOTOR FRAME AND CHANGER CHASSIS
TO UHF TUNER FILAMENTS
TO CONTROL BRACKET IN SOME VERSIONS TO PICTURE TUBE MOUNTING BRACKET IN SOME VERSIONS
DENOTES CHASSIS GROUND
TAKEN WITH PIN 6 OF VERT MULT. TUBE (V6) SHORTED TO GROUND, AND HEIGHT CONTROL (R7) SET AT CENTER OF ROTATION.
TO PICTURE TUBE HV ANODE
TO PIN 5 OF V8
BEAM ALIGN MENT MAGNET
DO NOT MEASURE
225V SOURCE
215V SOURCE
GRN
RED
BLUE
BRN
YEL
WHT
ADDITIONAL SCHEMATICS PAGE
TUNER 95-162-0 (VHF)..... 5
TUNER 95-163-0 (VHF with UHF provisions)..... 7
TUNER 95-164-0 (UHF)..... 18
TUNER 95-172-0 (VHF)..... 8
TUNER 95-173-0 (UHF-VHF & includes 95-174-0 "UHF" and 95-175-0 "VHF with UHF provisions")..... 17
RADIO MODEL 7777A Ch 528.53181..... 9
COMPONENT COMBINATION LAYOUTS..... 18
ALTERNATE AC INPUT CIRCUIT 6
12D4GTA 12DQ6A 6CG7 6CM7 24AEP4 5AQ5 6BN8
3BZ6 3BZ6 5AM8 6BH8 5U8
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1 DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied
A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACK
© Howard W. Sams & Co., Inc. 1959
SILVERTONE CHASSIS 528.51360, 362, 363, 365, 366, 370, 372, 373, 380, 381, 382, 390, 391, 392, 440, 441, 450, 451

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

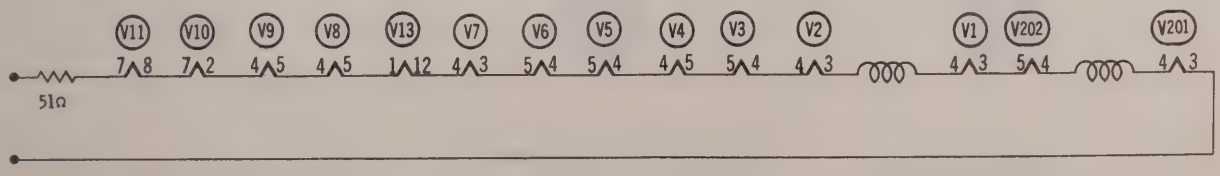
POWER SUPPLY FAILURE
No raster, no sound - RECTIFIER (B+)

SWEEP FAILURE
No raster, has sound - V9, V10, V11, V12, V13
No vertical deflection - V8
Poor vert. linearity or foldover - V8
Poor horiz. linearity or foldover - V9, V10, V11
Narrow picture - V9, V10, V11 RECTIFIER (B+)
Vert. off freq. - V8
Horiz. off freq. - V9

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V1, V2, V3, V4
No pic, no sound, has snow - V201, V202, V1
No pic, has sound, has raster - V4, V13
Has pic, no sound - V5, V6, V7

SYNC FAILURE
No vert. sync - V4, V5
No horiz. sync - V4, V5, V9
No vert. or horiz. sync - V4, V5

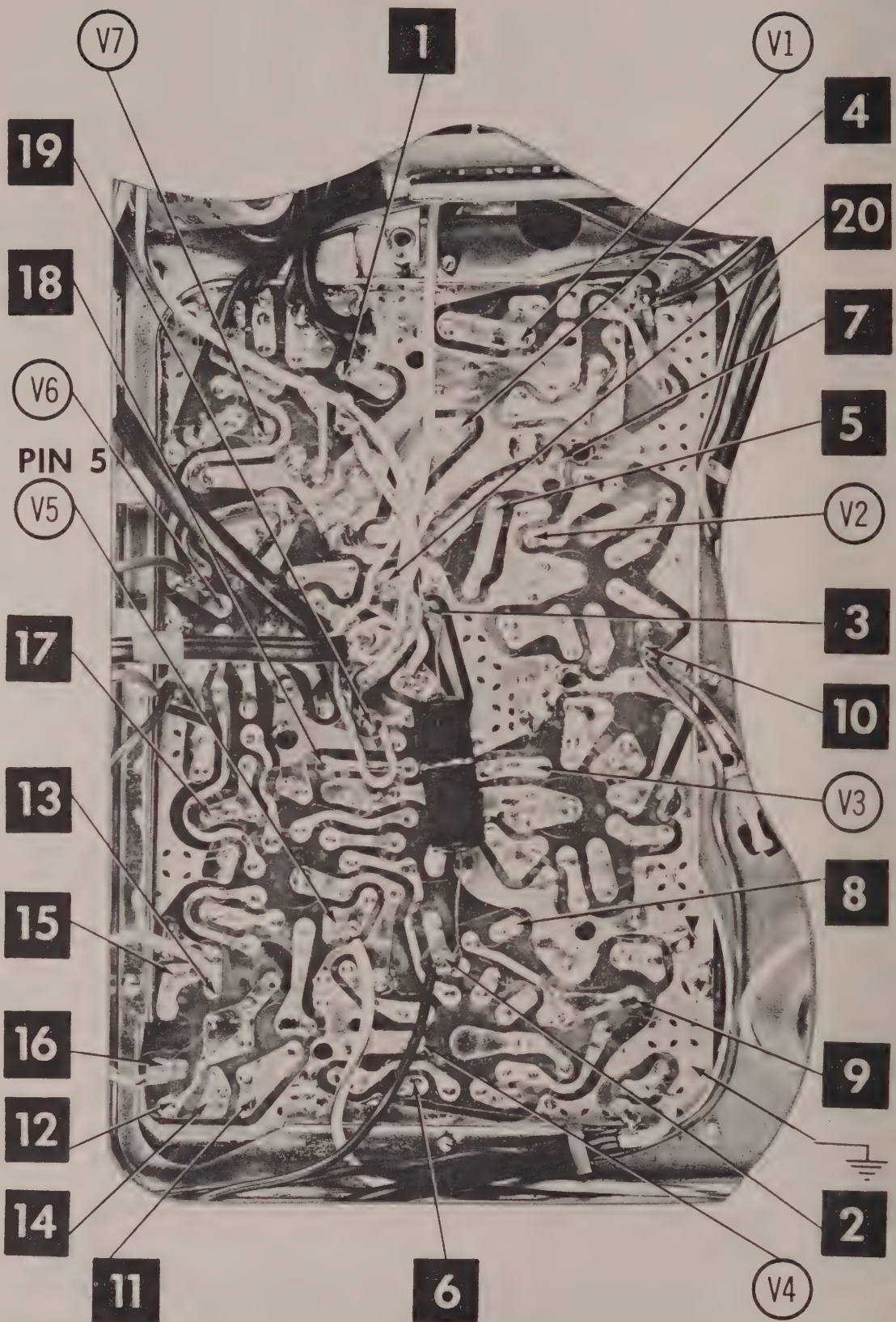
This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



SILVERTONE CHASSIS 528.51360, 362, 363, 365, 366, 370, 372, 373, 380, 381, 382, 390, 391, 392, 440, 441, 450, 451

FOLDER 2

CircuiTrace Numbers 1 thru 20



A Howard W. Sams CIRCUITRACE Photo

IF, SYNC, SOUND
PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1959

TUNER ALIGNMENT INSTRUCTIONS

TUNERS #95-162-0 & 95-163-0

Suggested alignment tools .....General Cement #8607.
Walsco #2523

VHF OSCILLATOR ALIGNMENT

Turn the set on and allow 15 minute warm-up period. Set the Fine Tuning to the center of its range. This is accomplished by turning the Fine Tuning so that the hole in the fiber drive wheel is centered over the channel 12 oscillator adjustment hole.
Turn the Channel Selector to the highest frequency channel operating in the area. With a non-metallic screwdriver, adjust the proper oscillator adjustment screw for clearest picture. The oscillator adjustment screws are identified by the channel number stamped into the metal next to the proper adjustment opening. Channels 7 and 8 share the same screw for adjustment, all others have separate adjustment screws.
Be very careful not to turn any of the adjustment screw too far counterclockwise, or they will fall out.
Always adjust the highest operating channel first, then the others in descending order.

VHF RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

UHF ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

TUNERS #95-172-0 & 95-175-0

VHF OSCILLATOR ALIGNMENT

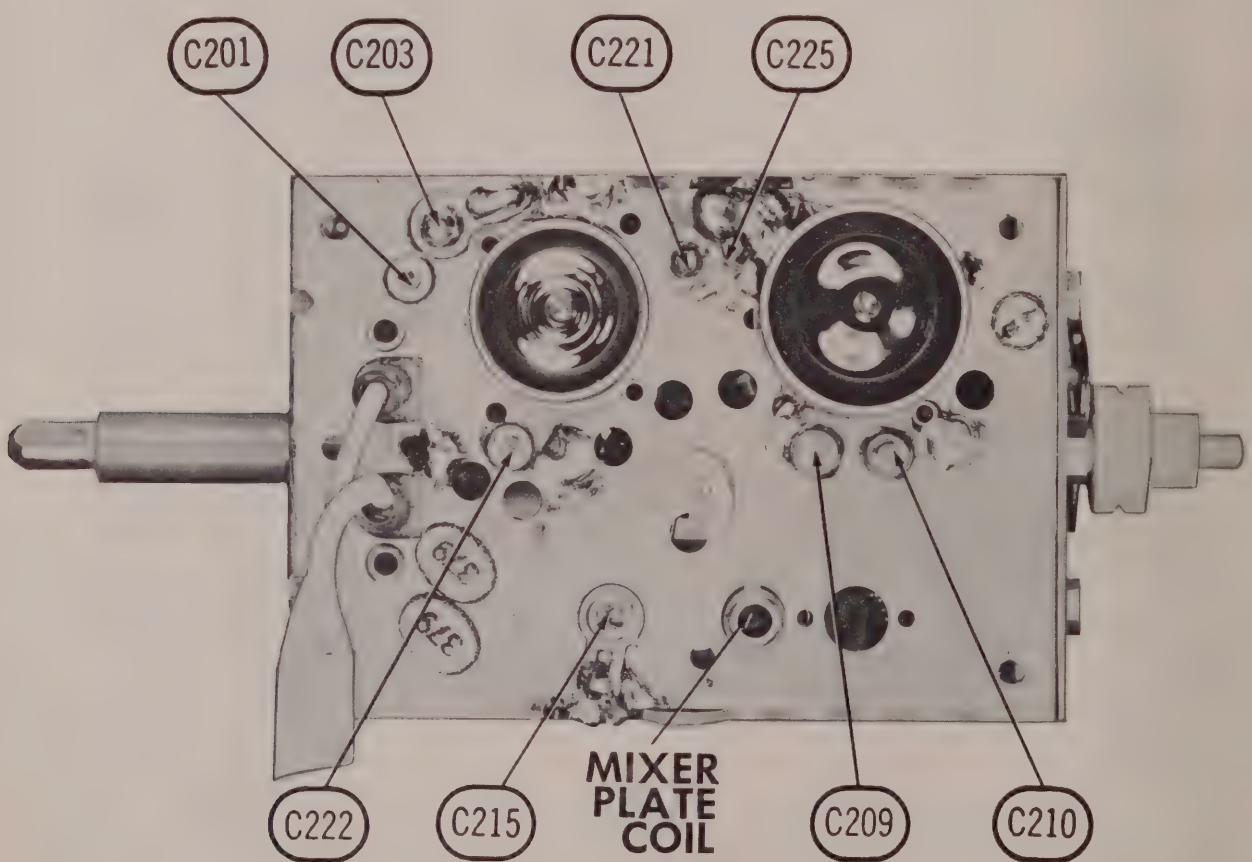
Set the Fine Tuning to the center of its range (flat of fine tuning shaft parallel with top of tuner). Set the Channel Selector to the highest high band channel (13-7) operating in the area. Adjust the high band oscillator adjustment slug (A201 located at 2 o'clock) for best picture and sound. Switch Channel Selector to the highest low band channel (6-2) operating in the area and adjustment (A202 located at 6 o'clock) for best picture and sound. Recheck high band adjustment.

VHF RF AND MIXER ALIGNMENT

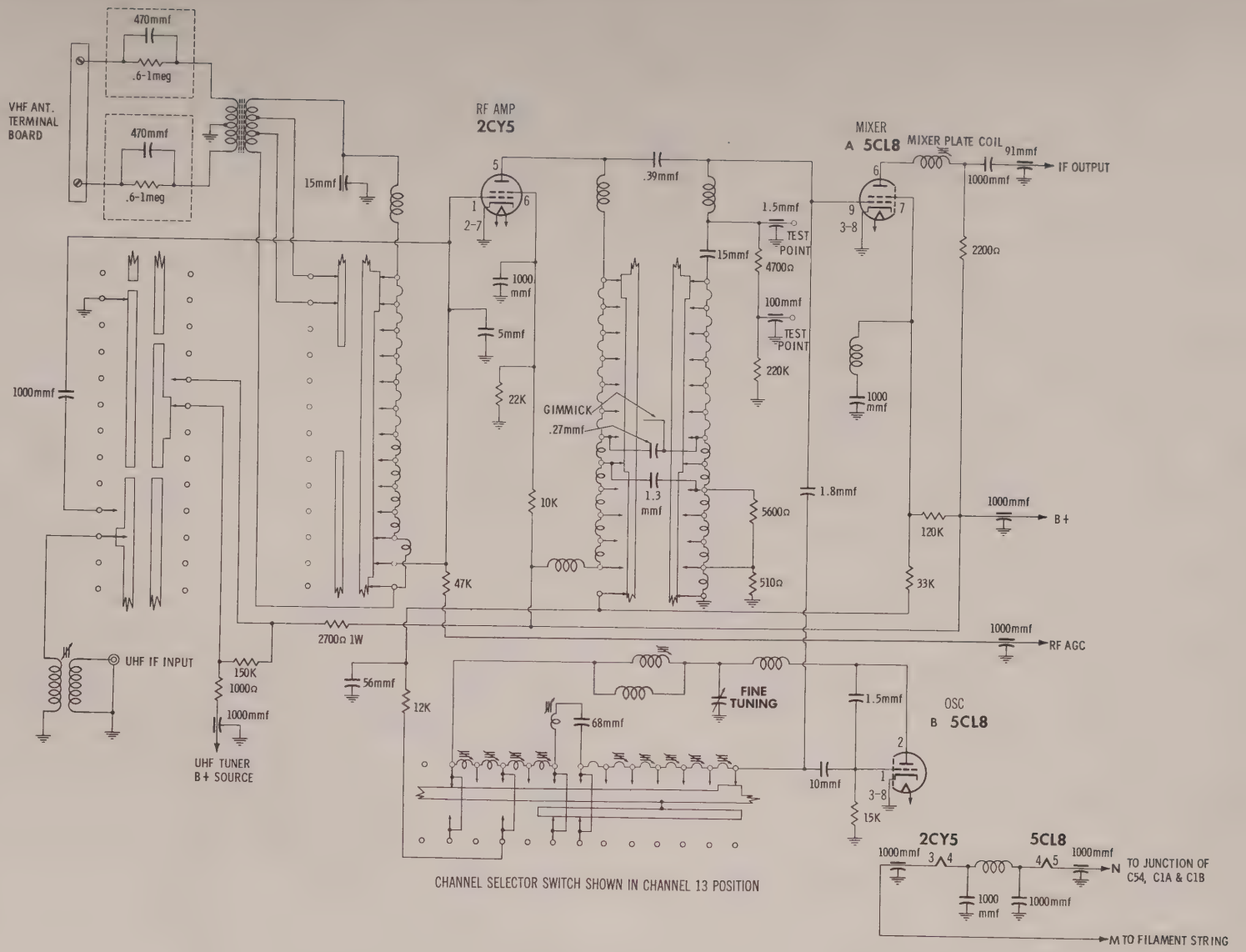
This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.



VHF TUNER 95-162-0

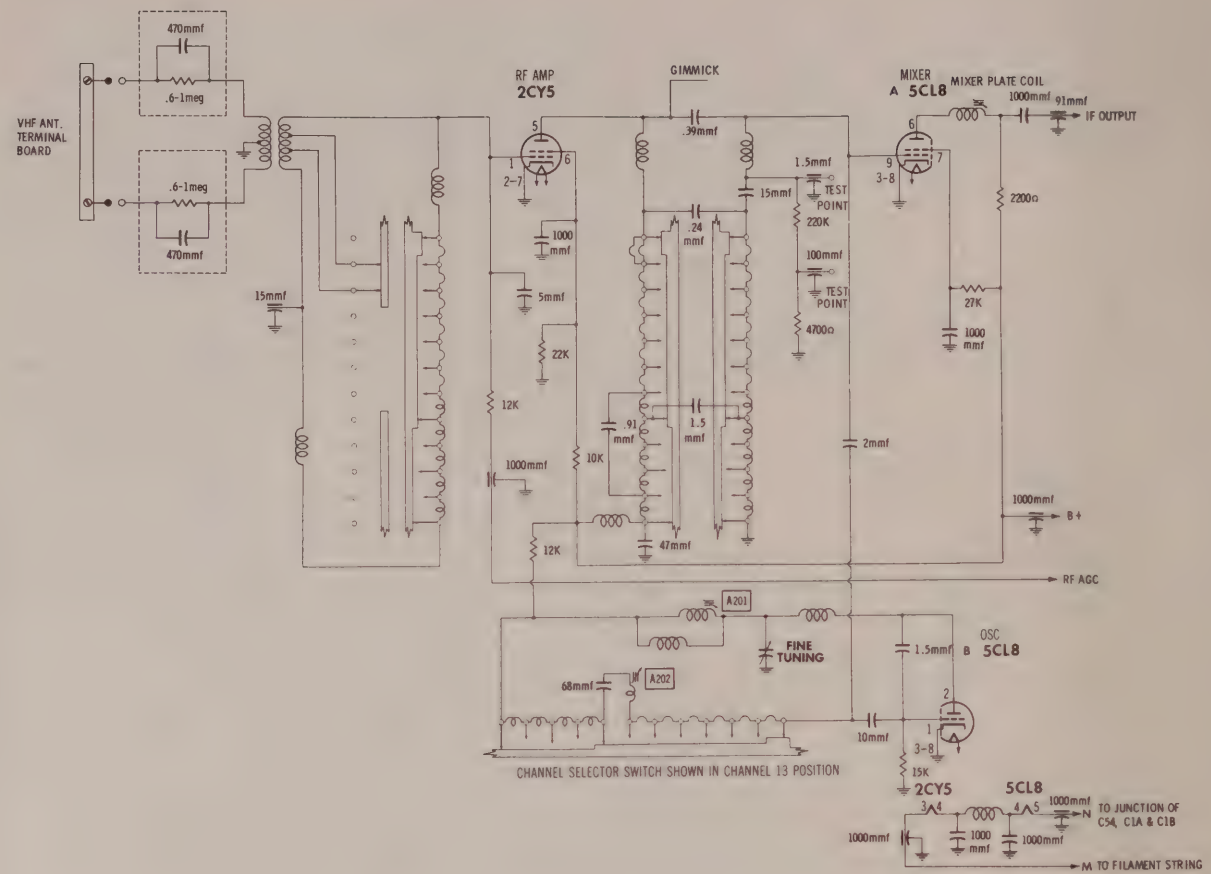


A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

VHF TUNER WITH UHF PROVISIONS 95-163-0

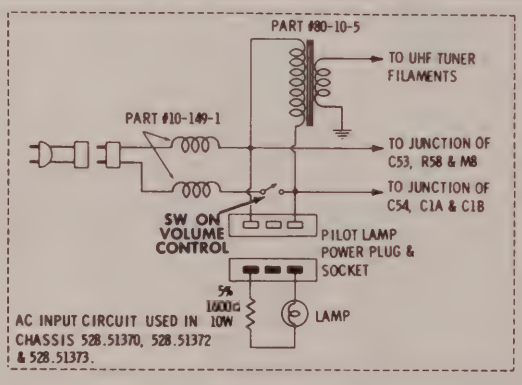
SILVERTONE CHASSIS 528.51360, 362, 363, 365, 366, 370, 372, 373, 380, 381, 382, 390, 391, 392, 440, 441, 450, 451

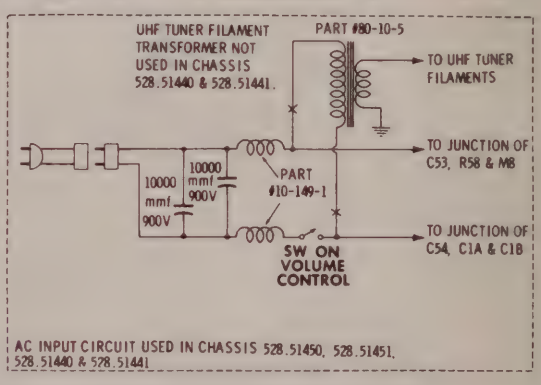


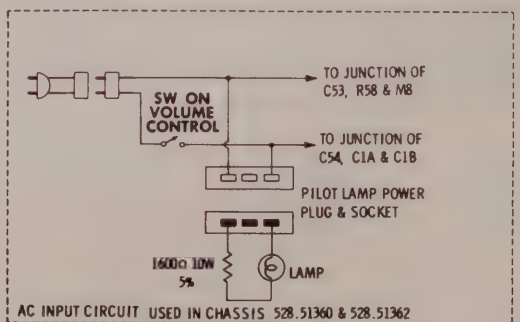
A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

VHF TUNER 95-172-0


PART #80-10-5
TO UHF TUNER FILAMENTS
PART #10-149-1
TO JUNCTION OF C53, R58 & M8
TO JUNCTION OF C54, C1A & C1B
SW ON VOLUME CONTROL
PILOT LAMP POWER PLUG & SOCKET
5% 1600Ω 10W
LAMP
AC INPUT CIRCUIT USED IN CHASSIS 528.51370, 528.51372 & 528.51373.

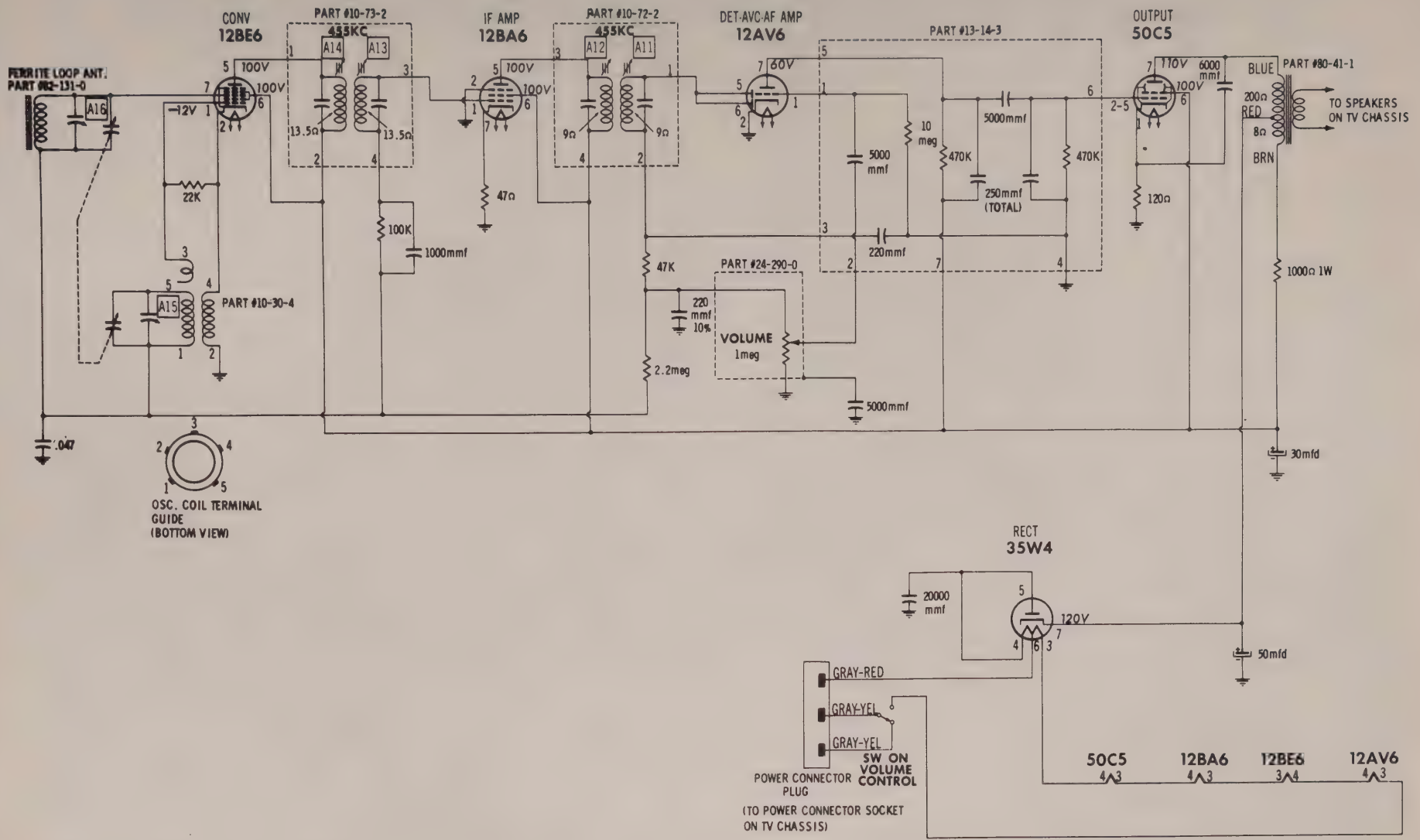

UHF TUNER FILAMENT TRANSFORMER NOT USED IN CHASSIS 528.51440 & 528.51441.
PART #80-10-5
TO UHF TUNER FILAMENTS
TO JUNCTION OF C53, R58 & M8
10000 mmf 900V
10000 mmf 900V
PART #10-149-1
TO JUNCTION OF C54, C1A & C1B
SW ON VOLUME CONTROL
AC INPUT CIRCUIT USED IN CHASSIS 528.51450, 528.51451, 528.51440 & 528.51441


TO JUNCTION OF C53, R58 & M8
SW ON VOLUME CONTROL
TO JUNCTION OF C54, C1A & C1B
PILOT LAMP POWER PLUG & SOCKET
1600Ω 10W 5%
LAMP
AC INPUT CIRCUIT USED IN CHASSIS 528.51360 & 528.51362

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

ALTERNATE AC INPUT CIRCUITS



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

RADIO MODEL 7777A (CH. 528.53191)

SILVERTONE CHASSIS 528.51360, 362, 363, 365, 366, 370, 372, 373, 380, 381, 382, 390, 391, 392, 440, 441, 450, 451

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER to PROTECT the Test Equipment.
The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: General Cement #8282, 8606, 8606L or 9295.
Walsco #2543, 2544, 2545.

VIDEO IF ALIGNMENT

Short antenna terminals together, but not to chassis.
Connect the negative lead of a 3 volt bias supply to point Ⓐ . Positive to chassis.
Detune A1, A4, A5, A6 and Mixer Plate Coil by turning cores almost out of coil forms.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44.15MC (Unmod)	Any non-interfering channel	DC probe thru 10K to point Ⓑ . Common to chassis. (Across Video Det. load)	A1, A2, & Mixer Plate Coil	Attenuate generator output to maintain not more than 2.5 volts on VTVM. Adjust for maximum deflection.
2.	"	"	42.75MC	"	"	A3	"
3.	"	"	45.5MC	"	"	A4	"
4.	"	"	47.25MC	"	"	A5	Increase generator output. Adjust A5 for MINIMUM deflection.
5.	"	"	41.25MC	"	"	A6	Adjust for MINIMUM deflection.

OVERALL VIDEO IF RESPONSE CHECK

Short antenna terminals together, but not to chassis.
Attenuate sweep generator output to maintain not more than 2 volts peak to peak on scope (-3 volts DC at point Ⓑ).
If separate marker generator is used, couple loosely to sweep cable.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44.25MC (10MC Swp)	41.25MC 42.75MC 43.8MC 44.25MC 45.0MC 45.75MC 47.25MC	Any non-interfering channel	Vert. Amp. thru 10K to point Ⓑ . Low side to chassis. (Across Video Det. load)		Check for response similar to Fig. 1. Retouch Mixer Plate Coil, if necessary to place 45.75MC marker at 50%. Retouch A1 for proper tilt.

SOUND IF ALIGNMENT

Connect two matched 100K (±1%) resistors in series from point Ⓒ to chassis. The junction of these two resistors is alignment point Ⓓ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.001mfd	High side to point Ⓑ . Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point Ⓒ . Common to chassis.	A7, A8, A9	Adjust for maximum deflection.
8.	"	"	"	"	DC probe to point Ⓔ . Common to point Ⓓ .	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

4.5MC TRAP ALIGNMENT

Tune in a strong TV station and check the picture for evidence of 4.5MC beat interference. If necessary, retouch A7 until the horizontal scanning lines are smooth and continous.

RADIO ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
9.	.1mfd	High side to pin 7 (grid) of converter (12BE6). Low side to chassis.	455KC (400~ 30% AM)	Radio	Tuning gang fully open	Across voice coil	A11, A12, A13, A14	Adjust for maximum deflection.
10.	"	"	1620KC	"	"	"	A15	"
11.		Loop	1400KC	"	1400KC	"	A16	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGE 6

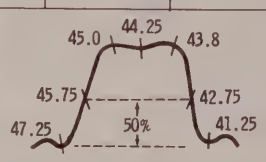


FIG.1

IF, SYNC, SOUND - PRINTED BOARD

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp	3BZ6	
V2	2nd Video IF Amp	3BZ6	
V3	3rd Video IF Amp - Video Det	5AM8	
V4	Video Output-Sync Sep.	6BH8	
V5	Sound IF-Sync Amp	5U8	
V6	Ratio Det -AF Amp.	6BN8	

ITEM No	USE	TYPE	NOTES
V7	Audio Output	5AQ5	
V8	Vert. Mult.-Vert. Output	6CM7	
V9	Horiz. AFC-Horiz Osc.	6CG7	
V10	Horiz. Output	12DQ6A	
V11	Damper	12DG6GTA	
V12	HV Rect.	1G3GT	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	Silvertone PART No	GENERAL ELECTRIC PART No	RCA PART No	SYLVANIA PART No.	
V13	24AEP4 21CBP4A		24AEP4 ① 21CBP4A ①	24AEP4 ② 21CBP4/ 21CBP4A ②	① "Silverama" ⑧ ② "Silver Screen 65"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Silvertone PART No	AEROVOX PART No.	CORNELL DUBILIER PART No	MALLORY PART No	PYRAMID PART No	SANGAMO PART No.	SPRAGUE PART No.
C1A	130	150	18-50-5	PR2-050	BR15015			MT-15150	TVAS-2465 *
B	130	150			BR15015			MT-15150	
C2A	40	300	18-23-2	PR5-500		WV404		Q-251.1 MT-4520	TVAS-5100 *
B	20	300							
C	20	300							
D	30	300							
E	50	50							
C3	4	50	18-25-0	PRS150V4	BBR4-50	TT50X4	TD-4-50	MT-0504	TVA-1402
C4	25	15	18-66-5 ①	PRS25V25	BBR25-25	TT15X30	TD-25-25	MT-0225	TVA-1205
C5	20	350	18-76-5 ②	NP-PRS350 V20	BR4035 † BR4035	TC78 † TC78	TD-40-350 TD-40-350	MT-4540† MT-4540	TVAS-1608-1 *

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
† Connect negative leads together. ③ Not used in Ch. 528.51440, 528.51450. ④ Alternate Part #18-76-1.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Silvertone PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.		
C6	.22	100	30-72-1	P288N-33		CUB2P22	GEM-2022	2TM-P22		
C7	.1	200	30-104S	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1		
C8	5000		15-502U7	BPD-005	DD-502	BYA10D5	B-250	5HK-D5		
C9	470		30-86-0	DI-470	MD-4?1	L10T47	JL-347	5GA-T47		10%
C10	47						CNO-427			NPO
C11	1000		30-78-0				JL-210			10%
C12	680		30-116-0		MD-681		JL-368			10%
C13	5000		15-502U7	BPD-006	DD-502	BYA10D6	B-250	5HK-D6		
C14	1000		30-78-0				JL-210	5HK-D1		
C15	4.7		30-23-0	NPO-S? 4.7	TCZ-4R7	CTA5Y47C	ET-5547	STCCB-Y47		NPO 10%
C16	.047	400	30-106-1	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47		
C17	33									N150
C18	33									N150
C19	1000		15-102U7	BPD-001	DD-102	BYA5D1	B-210	5HK-D1		
C20	.047	400	30-44-1	P488N-047	DF-503	BC5S47U	ACE5147	4SE-S47		
C21	1000		30-65-0	BPD-001	DD-102	BYA10D1	B-210	5HK-D1		
C22	1000		15-102U7	BPD-001	DD-102	BYA10D1	B-210	5HK-D1		
C23	2000		30-69-0	BPD-002	DD-202	BYA10D2	B-220	5HK-D2		
C24	1000		30-65-0	BPD-001	DD-102	BYA5D1	B-210	5HK-D1		
C25	.047	600	30-847-1		DF-503	CUB4S47	GEM-4147	4TM-S47		①
C26	10000		30-86-0	BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C27	1000		30-82-0	BPD-001	DD-102	BYA5D1	B-210	5HK-D1		10%
C28	.022	400	15-2S343	P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22		②
C29	5000		15-502U7	BPD-005	DD-502	BYA10D5	B-250	5HK-D5		
C30	5000	2000	20-79-0		DD30-502	BYA10D5		20HK-D5		
C31	.0066	400	16-S625T				GEM-16266	5SF-D66		10%
C32	.056	400	20-116-1					5SF-S56		10%
C33	.1	400	61-10448	P488N-1	DF-104	BC5P1J	ACE401	4SE-P1		
C34	.01	1000	30-78-1				GEM-1611	10TM-S1		10%
C35	.22	200	30-43-1	P288N-33		BC2P22J	ACE5142	2SE-P22		
C36	375		30-107-0							N750 10%
C37	.01	600	30-19-1							
C38	1000		30-66-2	1464-001		1R5D1	MCB-251	MB-21		5%
C39	.047	400	30-54-1	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47		
C40	10000		15-10317	BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C41	100	4000								10% ③
C42	75	4000								N1400 10% ③
C43	68	4000	15-680U4							N750 10% ③
C44	1000		30-65-0	BPD-001	DD-102	BYA5D1	B-210	5HK-D1		
C45	1000		30-65-0	BPD-001	DD-102	BYA5D1	B-210	5HK-D1		
C46	1000		30-65-0	BPD-001	DD-102	BYA5D1	B-210	5HK-D1		
C47	1000		30-65-0	BPD-001	DD-102	BYA5D1	B-210	5HK-D1		
C48	1000		30-65-0	BPD-001	DD-102	BYA5D1	B-210	5HK-D1		
C49	1000		30-65-0	BPD-001	DD-102	BYA5D1	B-210	5HK-D1		
C50	5000		30-76-0	BPD-005	DD-502	BYA10D5	B-250	5HK-D5		⑤
C51	5000		30-76-0	BPD-005	DD-502	BYA10D5	B-250	5HK-D5		⑤
C52	1000		30-65-0	BPD-001	DD-102	BYA5D1	B-210	5HK-D1		
C53	.047	600	30-847-1							
C54	.047	600	30-847-1							
C55	5000		20-17-0	BPD-006	DD-502	BYA10D5	B-250	5HK-D5		⑤
C56	10000	1400	30-122-0	DAC-27	DDI6-103	HVE16S1	2HV-110	BL-S10		⑤

① Not used in Ch. 528.51440, 441,450, 451.
② Ch. 528.51365, 366, 372, 373, 378, 382, 391, 392 use .01mfd 400V in this application (Part #16-10343). Not used in Ch. 528.51440, 441, 450, 451.
③ Not used in some versions. Other versions may use a single 180mmf N750 or N1500 2KV to replace C41 and C42 (Part #15-1R318).
④ Value may vary. Replace with original value.
⑤ Ch. 528.51360, 370, 440, 441, 450, 451 use 10000mmf in this application (Part #20-86-0).
⑥ Used in Ch. 528.51380, 381, 382, 390, 391, 392 only.
⑦ Not used in Ch. 528.51440, 441, 450, 451.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Silvertone PART No.	CENTRALAB PART No	CLAROSTAT PART No.	IRC PART No	MALLORY PART No	
R1A	1meg	½	24-322-0				FP15A	Volume, Note 1
B	Shaft						D8-37	
C	Switch						Not Req.	Push Type
R2A	250K	½	24-177-2	AB-51	A47-250K-Z	QU-130	U44	Tone, Note 2
B	Shaft			AK-8	RS-3/16	NQ	D8-37	
R3A	1000Ω	½	24-123-1	AB-5	A47-1000-S	QU-108	TA13L	Contrast, Note 3
B	Shaft			AK-8	RS-3/16	NQ	D8-37	
R4A	3meg	½	24-131-1	AB-84	A47-3meg-S	QU-140	TA36L	Brightness, Note 4
B	Shaft			AK-8	RS-3/16	NQ	D8-37	
R5A	1meg	½	24-124-1	AB-59	A47-1meg-S	QU-137	TA16L	Vert. Hold, Note 5
B	Shaft			AK-8	RS-3/16	NQ	D8-37	
R6	5000Ω	½	24-267-1					Vert. Lin., Note 6
R7	7meg	½	24-266-1					Height, with 330K stop
R8A	5meg	½	24-91-1	AB-86 †	B47-5meg-St	QU-141 †	PTA55L †	AGC, with 1.2meg stop
B	Shaft			AK-19	Not Req.	TQ	Not Req.	

† Use a 1.2meg resistor in series with the right hand terminal.
Note 1. Ch. 528.51440, 441, 450, 451 use Part #24-304-0.
Note 2. Not used in Ch. 528.51440, 441, 450, 451.
Note 3. Ch. 528.51440, 441, 450, 451 use Part #24-129-1.
Note 4. Ch. 528.51440, 441, 450, 451 use a 4meg control (Part #24-264-1).
Note 5. Ch. 528.51440, 441, 450, 451 use Part #24-113-1 .
Note 6. Alternate Part #24-114-1 used in some versions of Ch. 528.51440, 441, 450, 451.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Silvertone PART No.	NOTES
	OHMS	WATT		
R9	1000Ω		60-10203	Note 1
R10	10meg		60-10601	
R11	5600Ω		60-56201	
R12	18meg		60-18601	
R13	2.2meg		60-22502	
R14	18meg		60-18601	
R15	330Ω		60-33102	
R16	1000Ω		60-10202	
R17	56Ω		60-56001	
R18	15K		60-15301	
R19	1000Ω		60-10202	
R20	330Ω		60-33102	
R21	56Ω		60-56001	
R22	56K		60-56301	
R23	4700Ω	1	60-47201	
R24	220Ω		60-22101	
R25	820K		60-82401	
R26	4700Ω		60-47201	
R27	1meg		60-10502	
R28	3900Ω	4	61-9-1	
R29	22000Ω		60-22202	Note 2
R30	100K		60-10402	
R31	100K		60-10402	
R32	2200Ω		60-22202	
R33	18K		60-18301	
R34	6.8meg		60-68502	

ITEM No.	RATING		Silvertone PART No.	NOTES
	OHMS	WATT		
R35	220K		60-22402	
R36	470K		60-47402	
R37	270Ω	1	60-2711	
R38	8200Ω		60-82201	
R39	680K		60-68401	
R40	2.2meg		60-22501	
R41	100K	1	60-10411	
R42	1000Ω		60-10202	
R43	560Ω			Note 3
R44	560Ω			Note 3
R45	150K	1	60-15411	
R46	8200Ω		60-82201	
R47	180K		60-18401	
R48	4700Ω	2	60-47221	
R49	56Ω			Note 3
R50	1000Ω	1	60-10211	
R51	3.9Ω		60-39901	
R52	4700Ω		60-47202	
R53	470Ω	1	60-47112	
R54	16000Ω 5%	10	61-135-0	
R55	1200Ω	2	60-12221	
R56	1700Ω 5%	15	61-138-0	
R57	4.5Ω	10	61-115	
R58	5Ω	25	61-116	
R59	16000Ω 5%	10	61-135-0	Note 4
R60	4.7meg		60-47502	Note 4

Note 1. Not used in Ch. 528.51360 and some versions of 528.51370.
Note 2. Not used in some versions of Ch. 528.51360.
Note 3. Value may vary. Replace with original value.
Note 4. Not used in Ch. 528.51440, 441, 450, 451.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Silvertone PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Rem PART No	
L1	1st Video IF	10-82-2					Includes 41.25MC Trap
L2	2nd Video IF	10-16-3					Includes 47.25MC Trap
L3	3rd Video IF	10-17-3					
L4	4th Video IF	10-83-2					
L5	Resonant Choke	10-65-1					12 Microhenries
L6	Series Peaking Coil	10-64-1		TV-198	6110		60 Microhenries
L7	Series Peaking Coil	10-66-1	19-3250 *	TV-198 *	6130 *	VP-8 *	270 Microhenries, wound on 15K resistor
L8	Shunt Peaking Coil	10-68-1	19-3250	TV-198	6130	VP-8	269 Microhenries
L9	1st. Sound IF	10-146-1					
L10	Ratio Detector	10-21-0					
L11	RF Choke	10-136-1	19-1002	SW630	4606		2.65 Microhenries
L12	Fil. Choke	10-122-1	19-1002	BC-563	4606		2.3 Microhenries
L13	Line Choke	10-149-1	19-3036	TV-180	6178	VP-1	40 Microhenries, Note 1
L14	Line Choke	10-149-1	19-3036	TV-180	6178	VP-1	40 Microhenries, Note 1
L15	RF Choke	10-126-1	19-3250	TV-198	6130	VP-8	270 Microhenries

* Parallel with 15K resistor. Note 1. Not used in Ch. 528.51360, 362.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Silvertone PART No.	Meissner PART No	Merit PART No.	Miller PART No.	Rem PART No.	Thordarson PART No	
L16	77Ω		10-13-5 ①						Horiz. Freq. Tapped ② 23Ω Horiz. Waveform 44Ω

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA								NOTES
		Silvertone PART No.	Halldorson PART No	Merit PART No	Rem PART No	Rogers PART No	Stancor PART No.	Thordarson PART No.	Triad PART No	
T1	Vert. Output Alt Vert. Output	B80-1-2C 80-1-2	Z1807 ①	A-2834 ①	V315 ①		VO-101 ②	26876	A-119X	
T2	Yoke-Horiz (20MH) (90°)-Vert. (65MH)	D80-5-4C	DF-807 3 4	MDF-92 3 4	Y90F19/43 2 3	PCM2045 2 3	DY-18A 2 3	Y-18 3 4	Y-41 & NW23 ④	
	Alt. Yoke Rear Cover & Centering Device	80-5-4 no. 28							YC-1 & CL-1	
	Alt. Rear Cover Centering Device	83-1034								
	Yoke Clamp	22-2-3								
	Alt. Yoke Clamp	22-115-3								
T3	Horiz. Output	80-3-3								

① Cut and tape blanking lead.
② Drill new mounting hole(s).
③ Use original rear cover, centering device & yoke damping network.
④ Jumper yoke terminals #1 and #6 and connect to pin #5 of yoke plug; connect yoke terminal #3 to yoke plug pin #7; yoke terminal #7 to yoke plug pin #2; yoke terminal #4 to yoke plug pin #3. Use original width sleeve.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Silvertone PART No.	Halldorson PART No	Merit PART No	Rem PART No	Stancor PART No	Thordarson PART No	Triad PART No	
T4	4800Ω	3-4Ω	80-72-1 ①	Z1107 ②	A-3026	AU-601 ③	A-3877 ③	24S48	S-6X	
	[illegible]3-4Ω		80-31-1 ②	Z1110	A-3026		A-3877 ③	24S48	S-6X	

① Used in Ch. 528.51360, 362, 363, 365, 366, 370, 372, 373, 380, 381, 382, 390, 391, 392.
② Used in Ch. 528.51440, 441, 450, 451.
③ Drill new mounting holes.

SPEAKER

ITEM No.	TYPE				REPLACEMENT DATA		NOTES
	SIZE	FIELD	V C IMP		Silvertone PART No.	QUAM PART No.	
SP1	8"	PM	6-8Ω		33-376-4 ①⑤	8A2128.4 ④	① Used in Models 9190, 9191, 9193, 9163
SP2	4"	PM	6-8Ω		33-318-4 ②⑤	4A0T27.4 ⑤	② Two used in Models 9130, 9131, 9132, 9133, 9190, 9191, 9193, 9193
SP3	4	PM	6-8Ω		33-318-4 ②⑤	4A0T27.4 ⑤	③ Two used in Models 9154, 9155, 9156, 9157, 9158, 9159, 9170, 9171, 9172, 9173
	5"	PM	3-4Ω		33-358-4 ③	5AIR	④ Used in Models 9114, 9115, 9116, 9117
	5"	PM					⑤ Parallel and phase.

COMPONENT COMBINATIONS

ITEM No	USE	DESCRIPTION	Silvertone PART No	REPLACEMENT DATA	
K1	Sound IF Screen Filter	5000mmf, 68K	1	Sprague	PRC-6
K2	Audio Circuit	560mmf, 5000mmf, 5000mmf, 250Ω, 270Ω 3309Ω, 22K, 470K	13-15-5		
K3	Sync Sep. Coupling	150mmf 10% N1500, 5000mmf, 22K, 270K, 2.2meg	13-9-5		
K4	Vert. Circuit	2000mmf, 9000mmf, 9000mmf, 9000mmf, 12K, 22K, 22K, 33K, 56K, 56K	13-20-3	Sprague	VS-19
K5	Horiz. Circuit	27mmf 10%, 47mmf 10%, 220mmf 10%, 5000mmf, 8000mmf, 6000mmf, 8200Ω, 15K, 18K, 100K, 330K, 330K, 470K, 680K	13-18-5 ②		
K6	Tuner Bracket Isolation	1000mmf ② 1000VAC, 4.7meg	13-17-3	Sprague	AC15-8

① Some versions may use individual components in this application.
② Some versions of Ch. 528.51360 may use Part #13-11-5 in this application, which is the same except the pin 2 resistor is 470K instead of 680K

RECTIFIERS

ITEM No	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	Silvertone PART No	FEDERAL PART No	GENERAL ELECTRIC PART No	INTERNATIONAL PART No	SARKES TARZIAN PART No	
M1	.250A	83-829 1	1236AH 1	1N1008 3	T300 1 TV500 2	40K 2	1 Selenium type 2 Silicon type 3 Germanium type
M2	.250A	83-829 1	1236AH 1	1N1008 3	T300 1 TV500 2	40K 2	

PHONO CARTRIDGE

ITEM No	REPLACEMENT DATA						REMARKS
	Silvertone PART No	ASTATIC PART No.		JENSEN PART No			
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE		
M3	33-235-0	53-T	GD-J				

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

SILVERTONE CHASSIS 528.51360, 362, 363, 365, 366, 370, 372, 373, 380, 381, 382, 390, 391, 392, 440, 441, 450, 451

FOLDER 2

PARTS LIST AND DESCRIPTIONS (Continued)

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	Silvertone PART No.	JENSEN PART No.	WALCO PART No.	
M4	83-1172	†S-66 or †♦S-66SD or ♦S-66D	†W-75TPS or †♦W-75DS or ♦W-75TPD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	Silvertone PART No.	NOTES
M5	Lamp	89-22	#1829
M6	Tuner	95-162-0	VHF Ch.528.51360, 362, 363, 365, 366, 380, 381, 382
	Tuner	95-172-0	VHF Ch. 528.51440, 441
	Tuner	95-163-0	VHF, With UHF Provisions, Ch. 528.51370, 372, 373, 390, 391, 392
	Tuner	95-175-0	VHF, With UHF Provisions, Ch. 528.51450, 451
	Tuner	85-164-0	UHF Ch. 528.51370, 372, 373, 390, 391, 392
	Tuner	95-174-0	UHF Ch. 528.51450, 451
	Tuner	95-173-0	VHF-UHF, Includes Tuners 95-174-0 and 95-175-0
M7	Switch	69-209-0	TV-Phono, DPDT, Slide Type. Not used in Ch. 528.51440, 441, 450, 451
M8	Circuit Breaker	43-2-2	Alternate Part #43-4-2
M9	Width Sleeve	83-1052	
	Magnet	27-66-2	Beam Alignment
	Printed Board	84-6778	IF, Sync, Sound (Less Tubes) Ch. 528.51360, 362, 363, 365, 370, 372, 380, 381, 390, 391, 440, 450
	Printed Board	84-7128	IF, Sync, Sound (Less Tubes) Ch. 528.51366, 373, 382, 392, 441, 451
	Printed Board	84-4911	Vert., Horiz., Osc. (Less Tubes) Ch. 528.51360, 362, 363, 365, 370, 372, 373, 380, 381, 382
	Printed Board	84-6793	Vert., Horiz., Osc. (Less Tubes) Ch. 528.51390, 391, 392, 440, 441, 450, 451

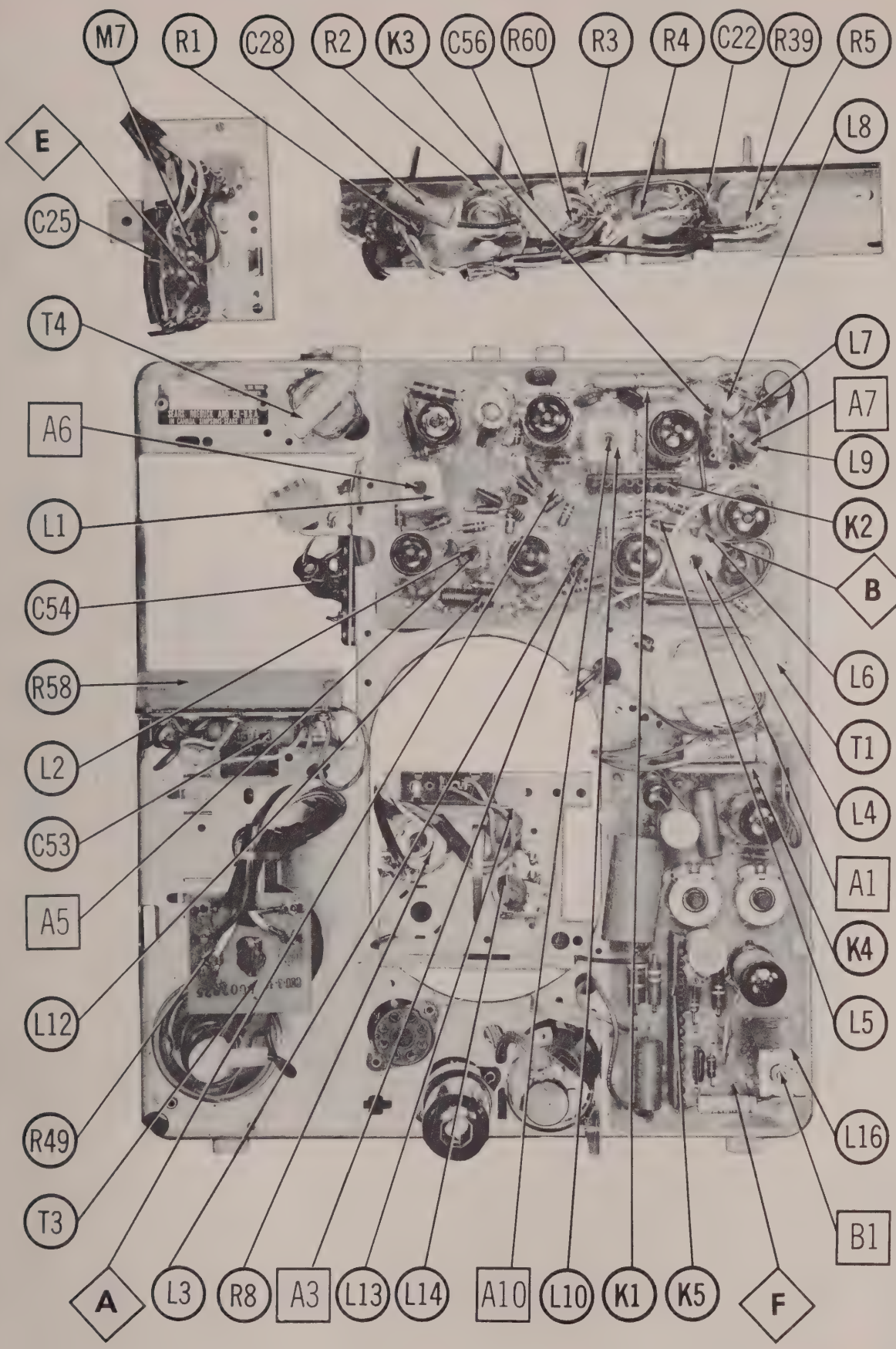
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

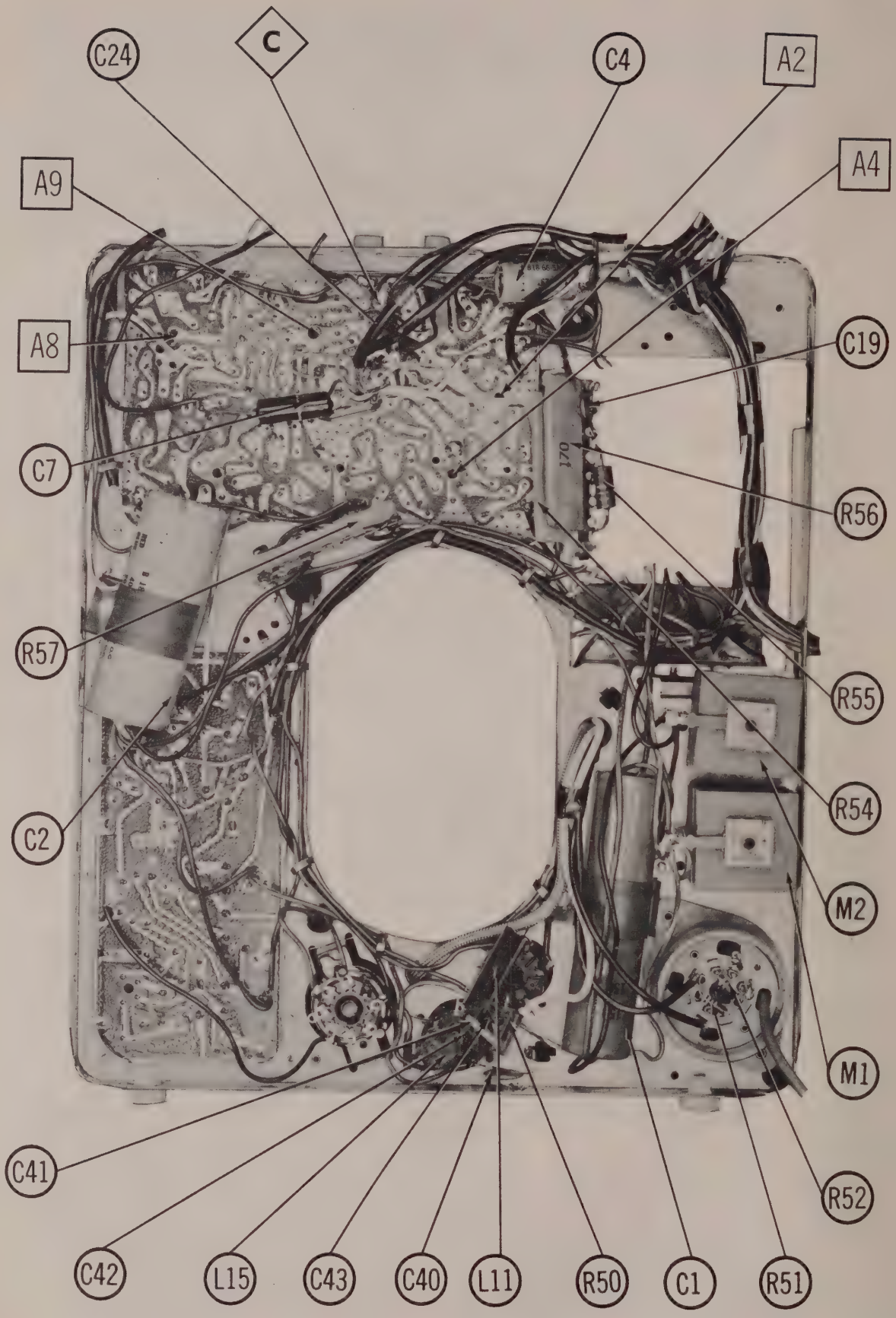
NAME	PART NO.	DESCRIPTION
Safety Glass	48-148-0	Models 9130, 9131, 9132, 9133
Safety Glass	48-150-0	Models 9114, 9115, 9116, 9117, 9154, 9155, 9156, 9157, 9158, 9159
Safety Glass	48-151-0	Models 9170, 9171, 9190, 9191, 9192, 9193
Bezel	40-17-5	Models 9114, 9115, 9116, 9117, 9154, 9155, 9156, 9157, 9158, 9159
Bezel	40-18-5	Models 9170, 9171, 9190, 9191, 9192, 9193
Bezel	40-20-5	Models 9130, 9131, 9132, 9133
Knob	52-1101-0	VHF Channel Selector, Models 9114, 9115, 9116, 9117, 9154, 9155, 9156, 9157, 9158, 9159, 9170, 9171, 9190, 9191, 9192, 9193
Knob	52-897-0	VHF Channel Selector, Models 9130, 9132
Knob	52-896-0	VHF Channel Selector, Models 9131, 9133
Knob	52-924-0	VHF Dial Indicator, Models 9115, 9117, 9155, 9157, 9171, 9191, 9193
Knob	52-886-0	UHF Channel Selector, Models 9131, 9133
Knob	52-898-0	UHF Channel Indicator, Models 9131, 9133
Knob	52-868-0	VHF Fine Tuning, Models 9131, 9133
Knob	52-1049-0	VHF Fine Tuning, Models 9130, 9132
Knob	52-926-0	UHF Fine Tuning, Models 9115, 9117, 9155, 9157, 9171, 9190, 9191
Knob	52-1097-0	Control, Fine Tuning (6 Used), Models 9114, 9115, 9116, 9117, 9154, 9155, 9156, 9157, 9158, 9159, 9170, 9171, (7 used on Models 9190, 9191, 9192, 9193)
Knob	52-1070-0	Control (4 Used), Models 9130, 9131, 9132, 9133
Knob	52-1127-0	TV-Phono, Models 9190, 9191, 9192, 9193
Cabinet	42-74-0	Mahogany, Models 9114, 9115
Cabinet	42-75-0	Blond, Models 9116, 9117
Cabinet	42-108-0	Mahogany, Model 9130, 9131
Cabinet	42-109-0	Blond, Models 9132, 9133
Cabinet	42-78-0	Mahogany, Models 9154, 9155
Cabinet	42-79-0	Blond, Models 9156, 9157
Cabinet	42-80-0	Maple, Model 9158
Cabinet	42-106-0	Walnut, Model 9159
Cabinet	42-76-0	Mahogany, Models 9170, 9171
Cabinet	42-98-0	Mahogany, Models 9190, 9191
Cabinet	42-99-0	Blond, Models 9192, 9193
Legs	49-412	Mahogany (4 Used) Models 9130, 9131
Legs	49-413	Blond (4 Used) Models 9132, 9133
Legs	49-351	Mahogany (4 Used) Models 9154, 9155
Legs	49-352	Blond (4 Used) Models 9156, 9157
Legs	49-353	Maple (4 Used) Modl 9158
Legs	49-408	Walnut (4 Used) Model 9159
Legs	49-184	Mahogany (4 Used) Models 9170, 9171
Legs	49-382	Mahogany (4 Used) Models 9190, 9191
Legs	49-383	Blond (4 Used) Models 9192, 9193
Swivel Base	83-1220	Assembly, Models 9154, 9155
Swivel Base	83-1221	Assembly, Models 9156, 9157
Swivel Base	83-1222	Assembly, Model 9158
Swivel Base	83-1242	Assembly, Model 9159

WIRING DATA

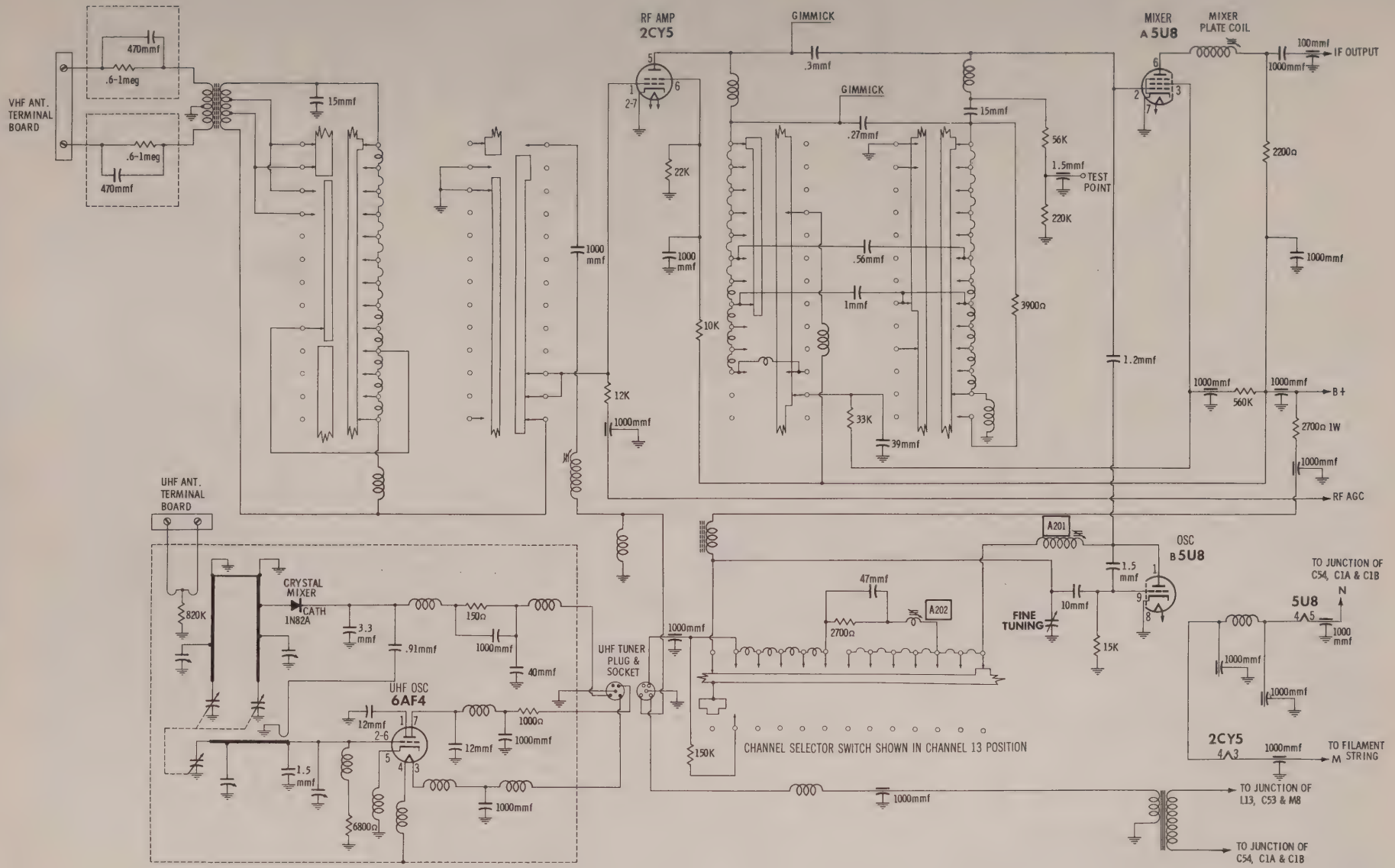
High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor



CHASSIS TOP VIEW



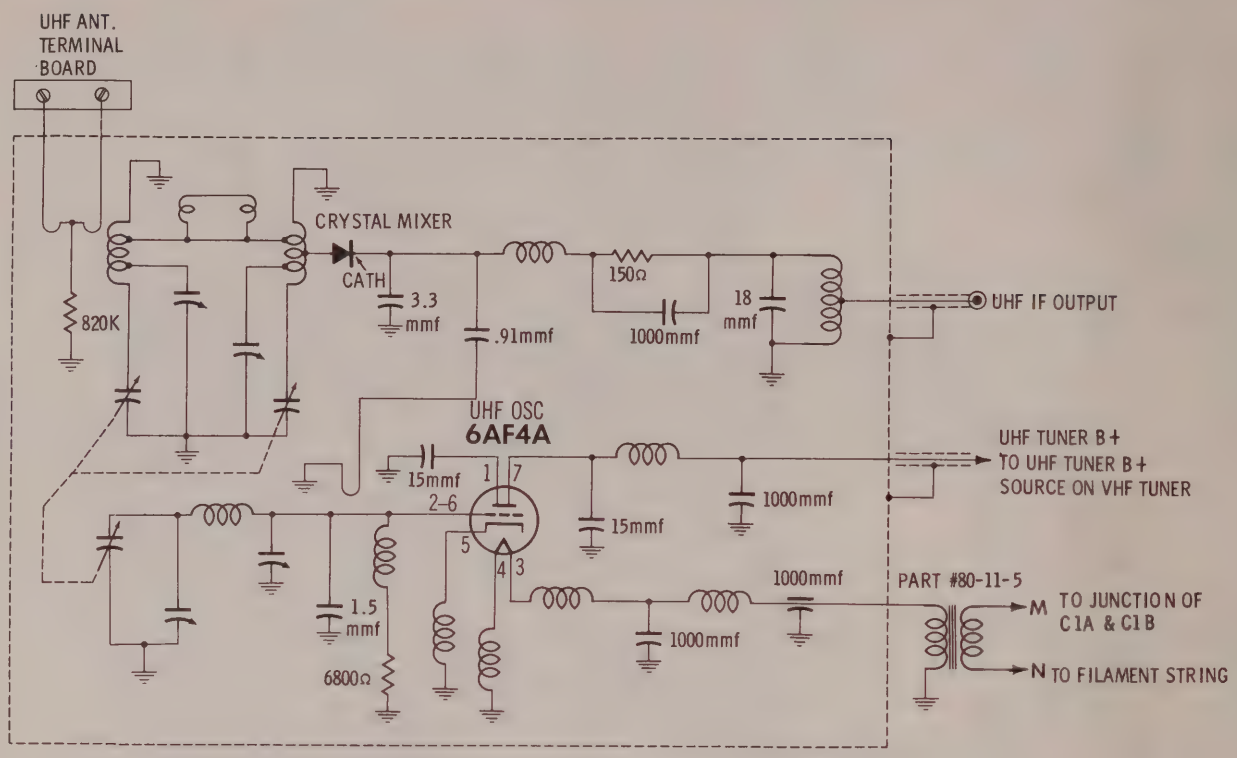
CHASSIS BOTTOM VIEW



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

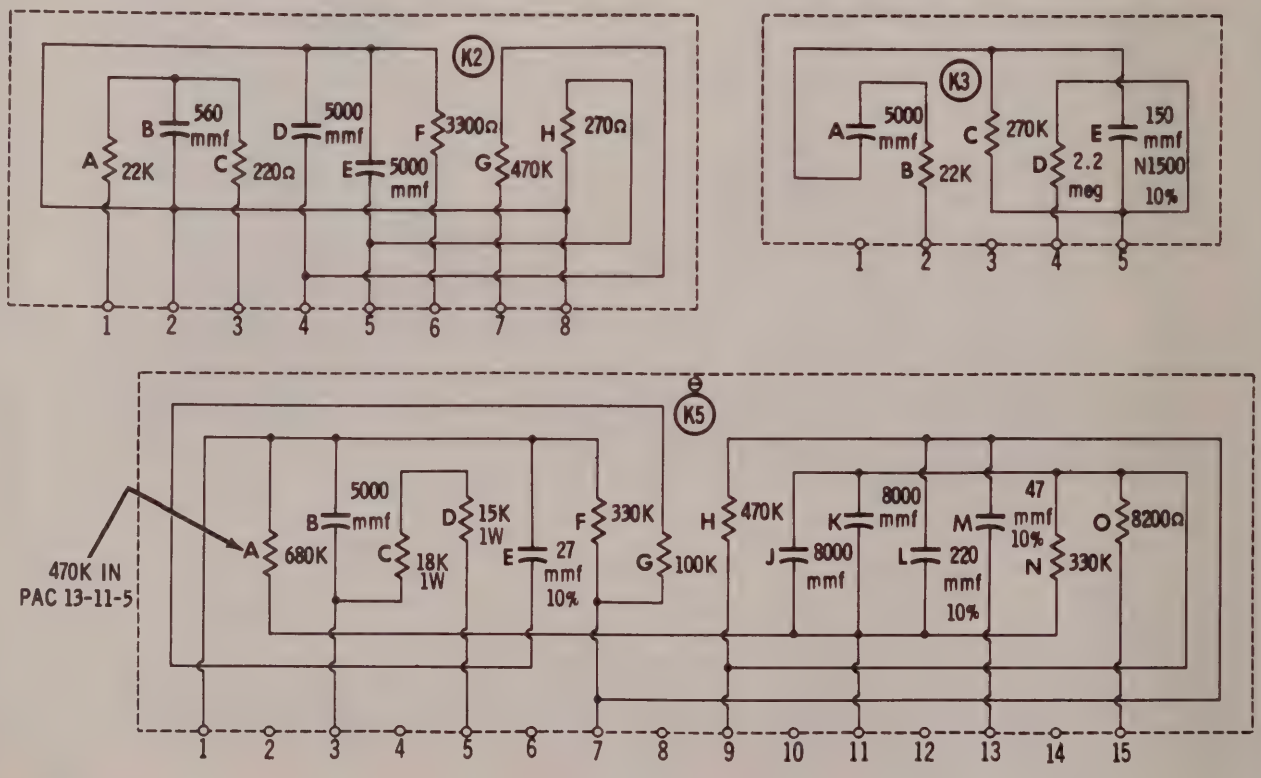
UHF-VHF TUNER 95-173-0, INCLUDES UHF95-174-0 & VHF 95-175-0



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

UHF TUNER 95-164-0



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

COMPONENT COMBINATION LAYOUT

TUNER PARTS LIST AND DESCRIPTIONS

95-162-0

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	2CY5	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	5CL8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	15		258-150						N750 10%
C202	5		225-509	NPO-DI 5	DD-050	L10V5	ZT-555	5GA-V5	
C203	1000		244-1						N750 5%
C204	.33		2101-338						10%
C205	1.5		2101-159	NPO-SI 1.5	TCZ-1R5	CTAV15C	ZT-5515	5TCCB-V15	10%
C206	.91		2101-918						10%
C207	47		233-470		DTN-47		CN7-447		N750 5%
C208	1000		2033-23	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C209	1.5		259-159						N750 5%
C210	100		252-102						N3300 10%
C211	15		222-150	NPO-DI 15	DD-150	L10Q15	CNO-415	5TCC-Q1	10%
C212	.39		2101-398						10%
C213	2		2101-209	NPO-SI 2					10%
C214	1000		2033-23	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C215	100		262-101	EF-0001	MFT-100			503C-T1	
C216	1000		2033-23	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C217	1.5		166-159						N3300 5%
C218	10		164-100		TCZ-10		CNO-410		5%
C219	68		233-680		DTN-68		CNO-468		N750 5%
C220			1713-512						
C221	1000		271-1	EF-001	MFT-1000			503C-D1	
C222	1000		244-1						5%
C223	1000		2033-23	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C224	1000		2033-23	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C225	1000		271-1	EF-001	MFT-1000			503C-D1	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		SILVERTONE PART No.	NOTES
	OHMS	WATT		
R201	12K		106-123	
R202	10K		106-103	
R203	22K		106-223	
R204	4700Ω		106-472	
R205	220K		111-224	

ITEM No.	RATING		SILVERTONE PART No.	NOTES
	OHMS	WATT		
R206	2200Ω		106-222	
R207	27K		106-273	
R208	15K		106-153	
R209	18K		106-183	Note 1

Note 1. Some versions may use 12K in this application (Part #106-123).

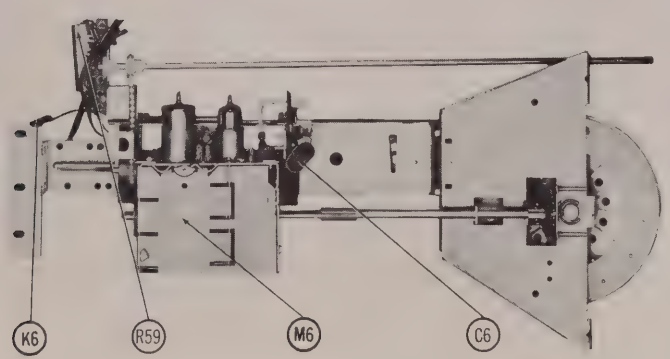
COILS (RF-IF)

ITEM No.	USE	SILVERTONE PART No.	NOTES
L201	Ant. Trans.	2309-5	
L202	RF Choke	310-4	
L203	RF Choke	310-4	
L204	RF Choke	313-7	
L205	RF Choke	301-23	

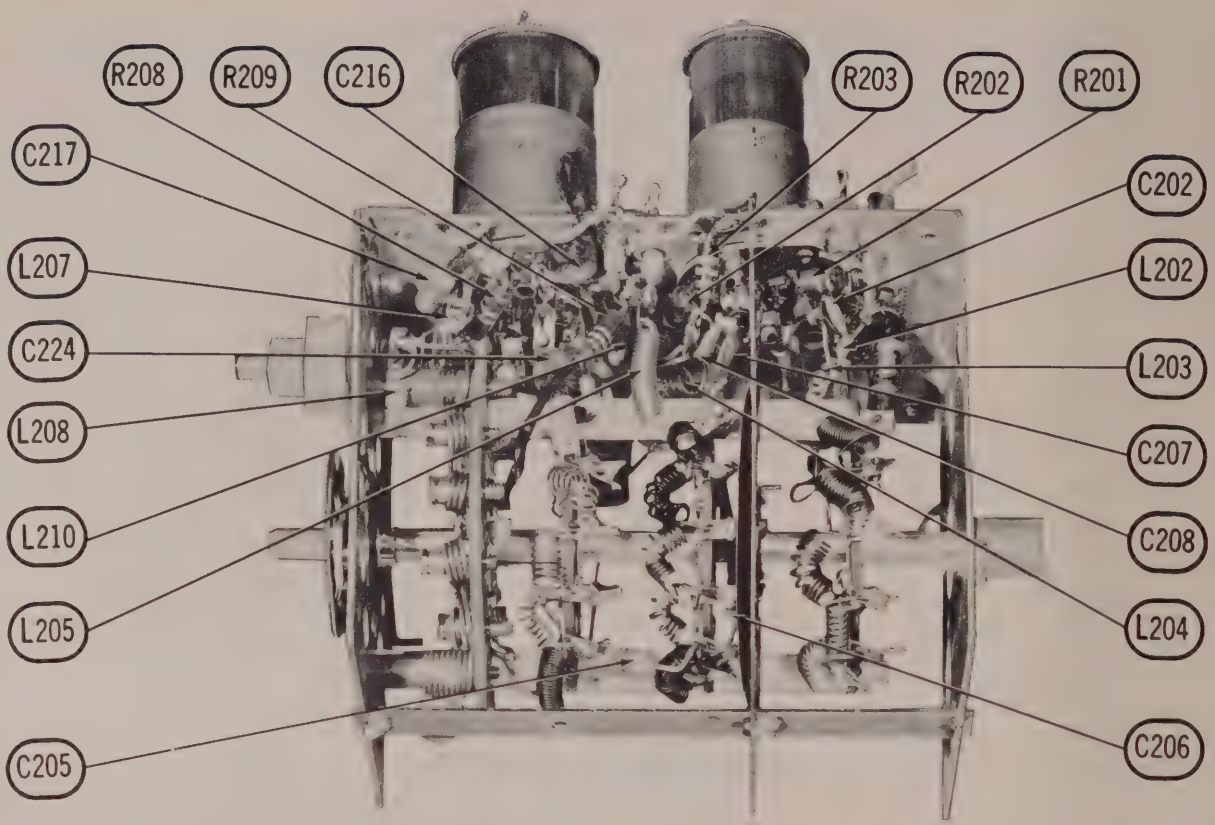
ITEM No.	USE	SILVERTONE PART No.	NOTES
L206	Mixer Grid	312-6	
L207	RF Choke	310-3	
L208	RF Choke	311-10	
L209	IF Trap	2110-9	
L210	Fil. Choke	300-20	

COMPONENT COMBINATIONS

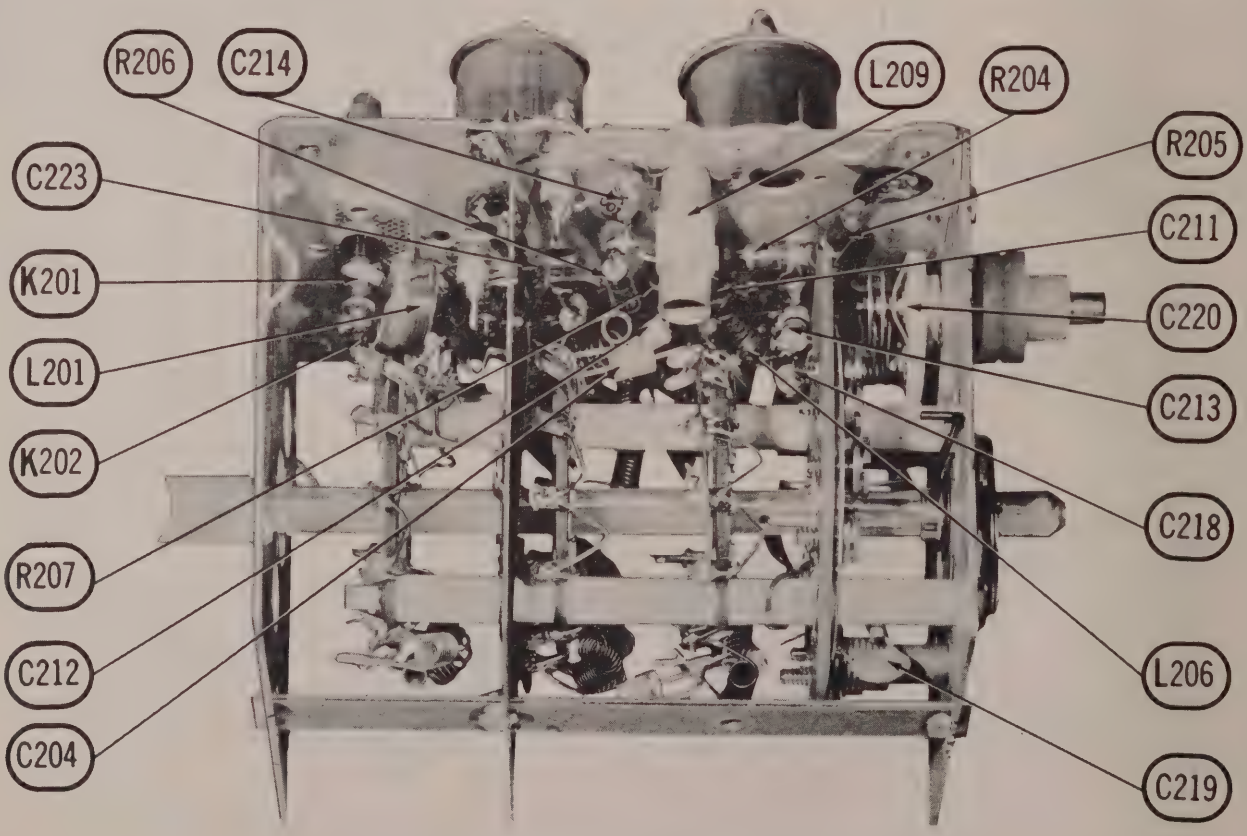
ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA	
K201	Antenna Filter	470mmf, .6-1meg	330-1	Centralab Sprague	RC-471 AC1-1
K202	Antenna Filter	470mmf, .6-1meg	330-1	Centralab Sprague	RC-471 AC1-1



TUNER ASSEMBLY

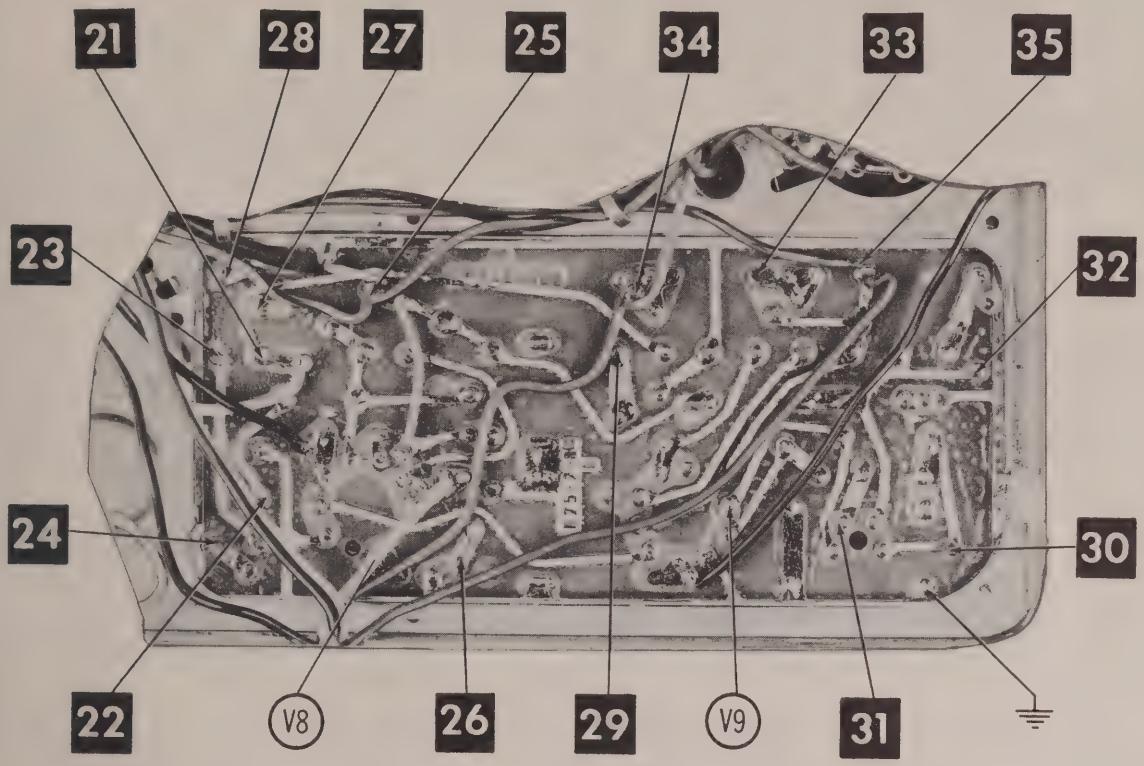


TUNER 95-162-0 LEFT SIDE



TUNER 95-162-0 RIGHT SIDE

CircuiTrace Numbers 21 thru 35

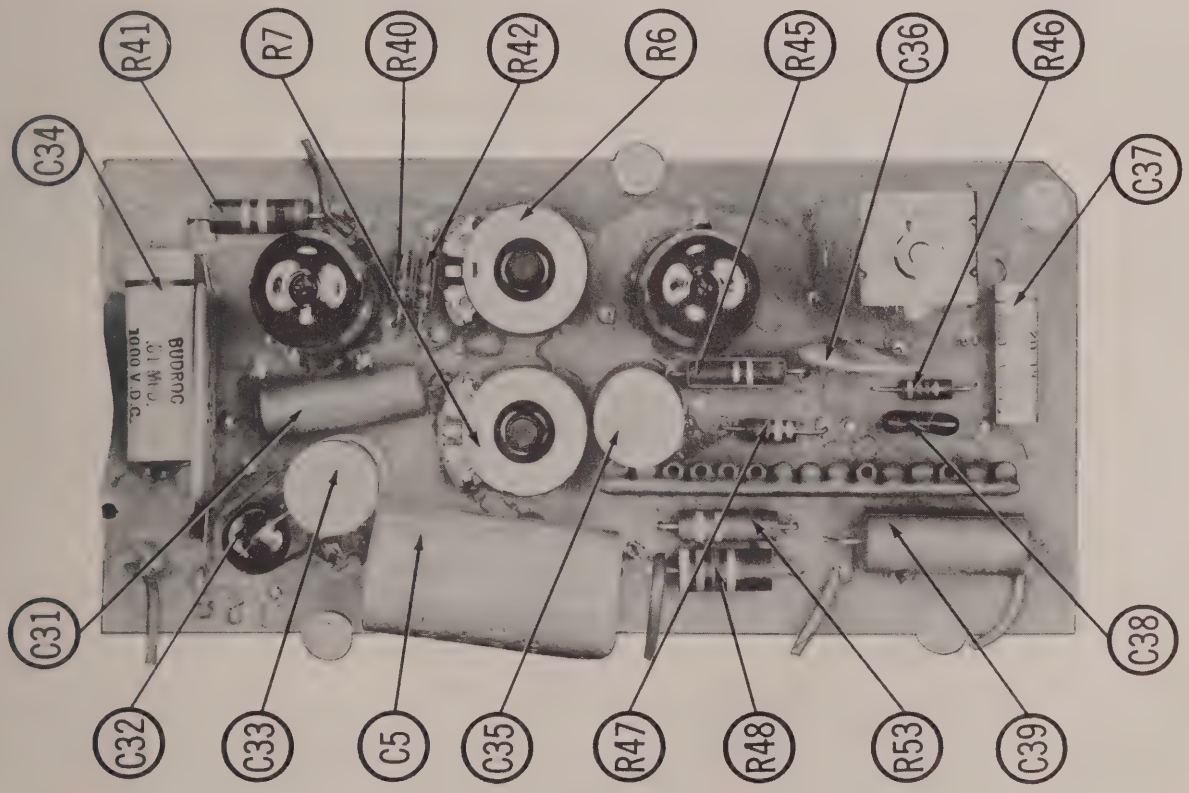


A Howard W. Sams CIRCUITRACE® Photo

VERT HORIZ PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

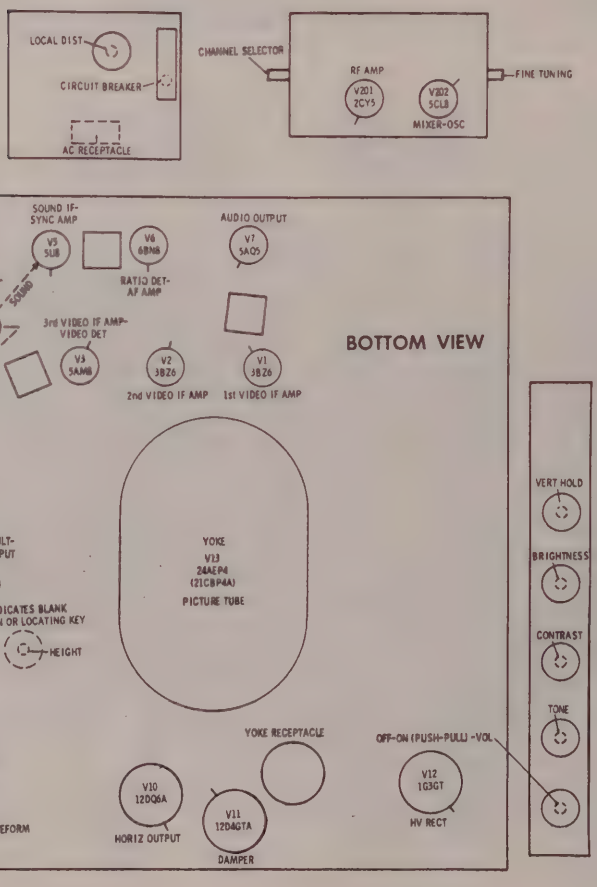
VERT HORIZ PRINTED BOARD



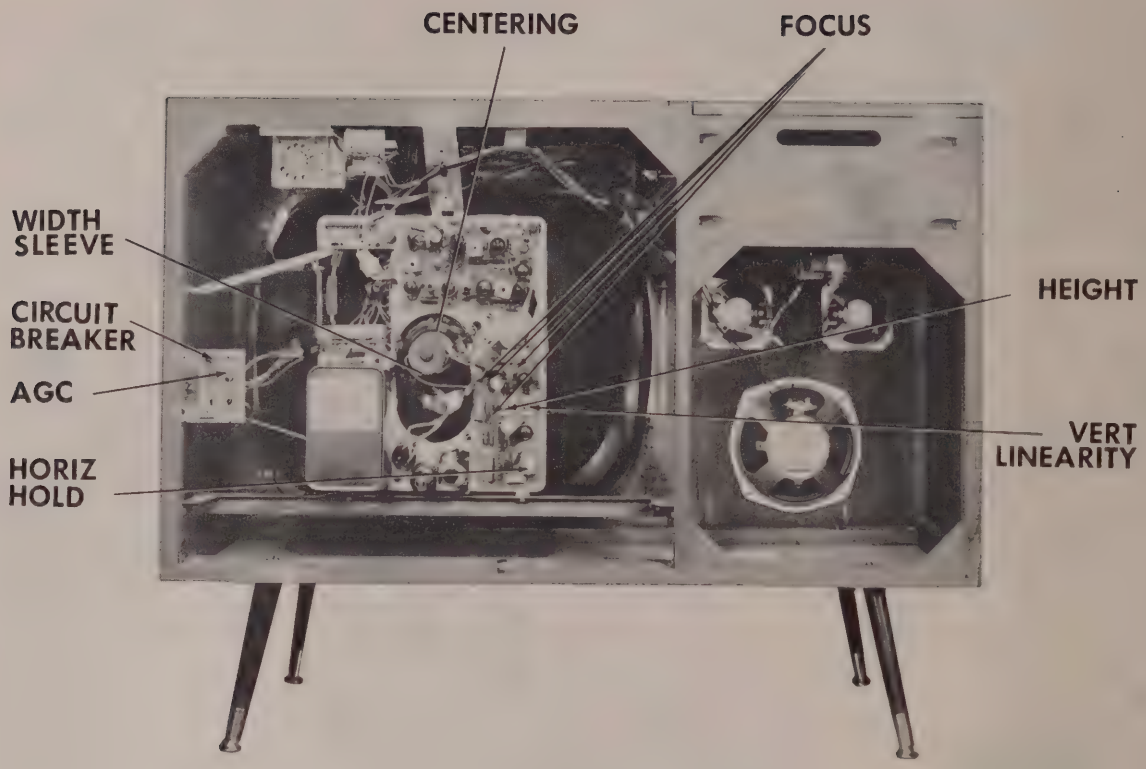
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	• 630K	56Ω	1.5Ω	2.5Ω	† 2900Ω	† 2900Ω	0Ω		
V2	3BZ6	630K	56Ω	2.5Ω	3.5Ω	† 1900Ω	† 1900Ω	0Ω		
V3	5AM8	220Ω	.1Ω	† 5200Ω	3.5Ω	4.5Ω	† 5200Ω	.1Ω	4700Ω	0Ω
V4	6BH8	0Ω	2.2meg	† 470K	5.5Ω	4.5Ω	• 600Ω	1meg	† 3800Ω	† 4300Ω
V5	5U8	† 9800Ω	4Ω	† 70K	5.5Ω	7Ω	† 3800Ω	270Ω	3300Ω	† 470K
V6	6BN8	INF	0Ω	INF	7Ω	8Ω	18K	† 220Ω	6.8meg	0Ω
V7	5AQ5	470K	270Ω	8Ω	9Ω	† 1600Ω	† 1200Ω	470K		
V8	6CM7	† 1800Ω	NC	0Ω	12Ω	10.5Ω	• 2.5meg	• 800K	2.2meg	• 1900Ω
V9	6CG7	† 33K	450K	0Ω	13.5Ω	12Ω	† 470Ω	420K	260K	NC
V10	12DQ6A	NC	13.5Ω	NC	† 4700Ω	420K	NC	17Ω	0Ω	TOP CAP ‡ 77Ω
V11	12D4GTA	TP	NC	¶ 230K	TP	† 2.4Ω	TP	20Ω	17Ω	
V12	1G3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP ‡ 507Ω
V13	24AEP4	10.5Ω	68K	PIN 6 ‡ 30Ω	PIN 10 ‡ 30Ω	PIN 11 • 730K	PIN 12 9 Ω			
V201	2CY5	12K	0Ω	1.5Ω	1Ω	† 1600Ω	† 11K	0Ω		
V202	5CL8	15K	† 18K	0Ω	1Ω	0Ω	† 3800Ω	† 28K	0Ω	220K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 225V SOURCE. NC NO CONNECTION
‡ MEASURED FROM PIN 3 OF V11. TP TIE POINT
NC NO CONNECTION.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

DISASSEMBLY INSTRUCTIONS

1. Remove 6 push-on type knobs from the front and 1 inside phonograph compartment.
2. Remove 12 wood screws and 1 metal screw holding rear cover. Remove rear cover.
3. Remove picture tube socket, yoke plug, pilot light, phono plug, speaker leads, HV lead, phono lead and 3 grounding leads.
4. Remove 2 wood screws holding circuit breaker panel.
5. Remove 2 wood screws holding phono control bracket.
6. Remove 2 hex nuts holding front control bracket.
7. Remove 2 metal screws holding tuner assembly bracket at the front, and 2 wood screws at the rear. Remove tuner assembly.
8. Remove 2 top and 2 bottom chassis bolts.
9. Remove chassis and tuner assembly from rear of the cabinet.

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune in a TV station and adjust the Horizontal Hold until the picture synchronizes horizontally. If the picture cannot be synced with the Horizontal Hold, turn the Wayeform slug (B1) several turns out of the coil form from its original position. Readjust the Horizontal Hold until the picture synchronizes horizontally.

Connect the vertical amplifier of a scope thru a low capacity probe to point (F). Connect low side to chassis. Retouch the Horizontal Hold to synchronize the picture.

Adjust the Waveform slug (B1) for a waveform similar to Fig. 2 with the sharp peak approximately 10% higher than the broad peak. Keep the picture in sync during this adjustment with the Horizontal Hold. Remove scope connection and retouch the Horizontal Hold, if necessary to synchronize picture horizontally.

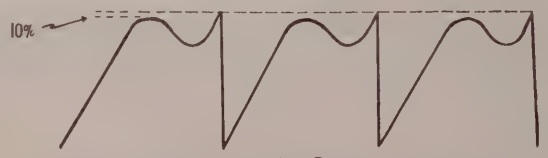


FIG. 2

PHOTOFACT* Folder

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

ZENITH CHASSIS
15B20, Q, U, UD

MODEL B1718BU (CH. 15B20UD)

ZENITH CHASSIS
15B20, Q, U, UD

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

SET 426 FOLDER 3

DISASSEMBLY INSTRUCTIONS

1. Remove 10 push-on type knobs.
2. Remove 5 metal screws holding rear cover. Remove rear cover.
3. Remove tuner, speaker, and wave magnet leads.
4. Remove 2 metal screws holding UHF tuner to cabinet side.
5. Remove 2 metal screws holding VHF tuner bracket to cabinet. Remove VHF tuner.
6. Remove 2 metal screws holding speaker to remove the speaker.
7. Remove 2 phillips screws holding wave magnet metal cover to cabinet.
8. Remove 2 metal screws holding wave magnet unit to the cabinet. Remove wave magnet unit.
9. Locate 2 inside sliding bars under Channel Selector housing panel. Slide these bars to the rear to release housing panel on cabinet top by lifting up.
10. Remove 2 phillips screws now visible holding volume control bracket. Remove volume control unit.
11. Remove 4 bottom chassis bolts. Remove chassis.

MODEL B1718BU (Ch. 15B20UD)

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS

TRADE NAME	Zenith	MODELS	CHASSIS
		B1410L, LZ, B1411P, PZ, B1412G, GZ, B1413G, GZ, B1715L, B1716C, B1717J, B1718B, B1719P, B1720C	15B20
		B1410LU, LZU, B1411PU, PZU, B1412GU, GZU, B1413GU, GZU, B1715LU, B1716CU, B1717JU, B1718BU, B1719PU, B1720CU	15B20U
		B1410LUD, LZUD, B1411PUD, PZUD, B1412GUD, GZUD, B1413GUD, GZUD, B1715LUD, B1716CUD, B1717JUD, B1718BUD, B1719PUD, B1720CUD	15B20UD
		B2001L	15B20Q

MANUFACTURER	Zenith Radio Corp., 6001 Dickens Avenue, Chicago 39, Illinois
TYPE SET	Television Receiver
TUBES	Sixteen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 150 Watts, 1.48 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. The adjustments are accessible, one at a time, as the Channel Selector is rotated. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Remove Channel Selector and Off-On-Volume knobs.
Remove 1 phillips screw now visible.
Remove plastic wrap around mask by pulling outward.
Remove 4 metal screws holding safety glass retainers.
Remove safety glass.

SPECIAL ADJUSTMENTS

A. AGC
Observe the picture and advance the AGC control to a point where the picture distorts or a buzz is heard in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

B. Focus
No provision is made to vary the focus on this receiver.

C. Fringe Lock
Adjust picture to lock in with hold controls. If picture jitters, tears, etc. adjust Fringe Lock until stable. Readjust the hold controls and check operation on all channels in the area.

D. Width
The width may be varied by means of a metallic sleeve located between the yoke and the picture tube neck. Adjust sleeve in or out of the yoke for a picture slightly larger than necessary to fill the screen.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the Horizontal Oscillator, it is necessary to remove the rear cover and supply power to set. Set the Horizontal Hold at the center of its range and adjust the Horizontal Oscillator slug (B1) until the picture synchronizes horizontally. (For location, see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Buzz control for MINIMUM buzz and maximum sound. (For location, see tube placement chart.)

FUSE DEVICE

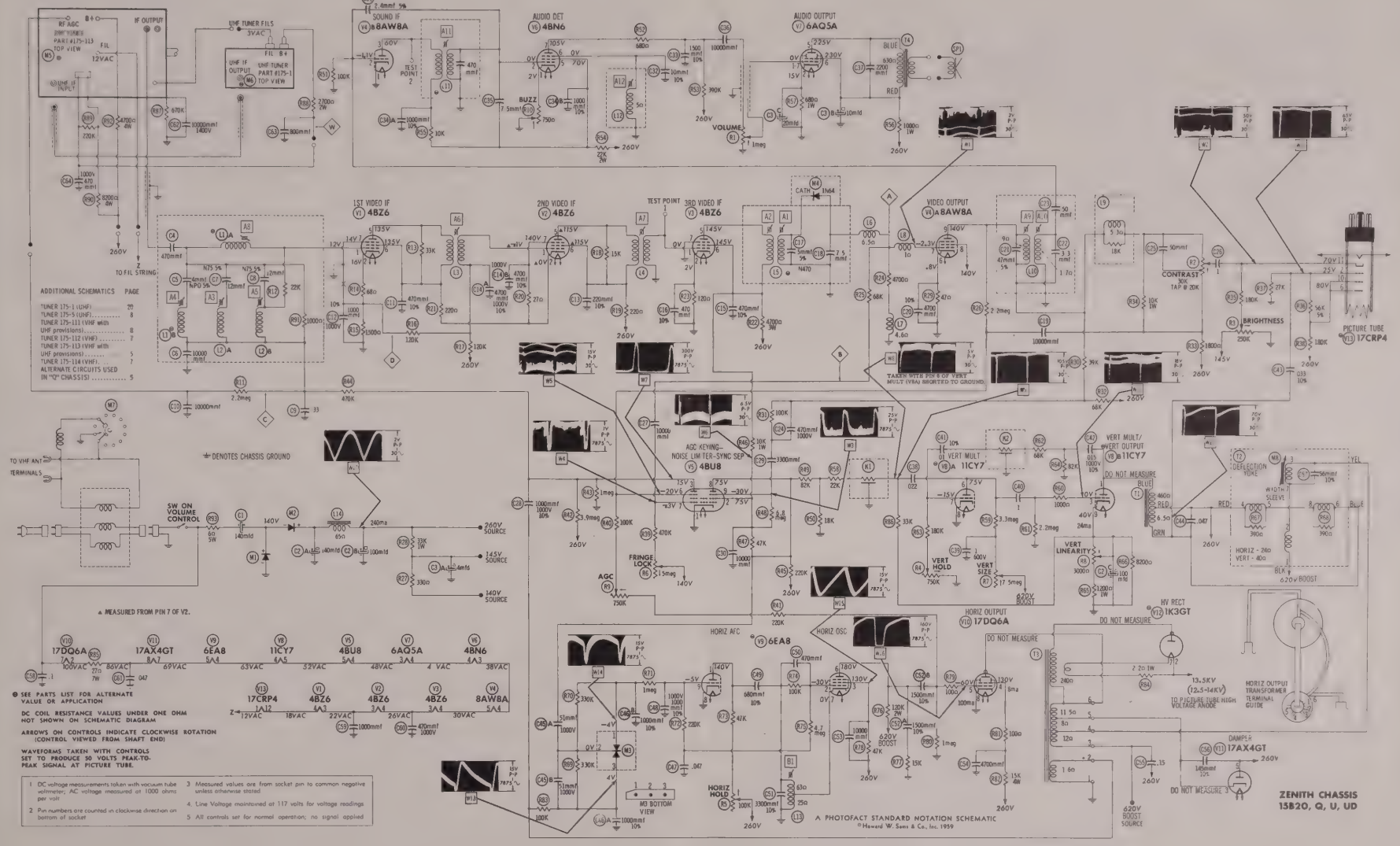
A 6Ω fusible resistor (R93) is used for low voltage power supply protection. (For location, see tube placement chart.)

CENTERING

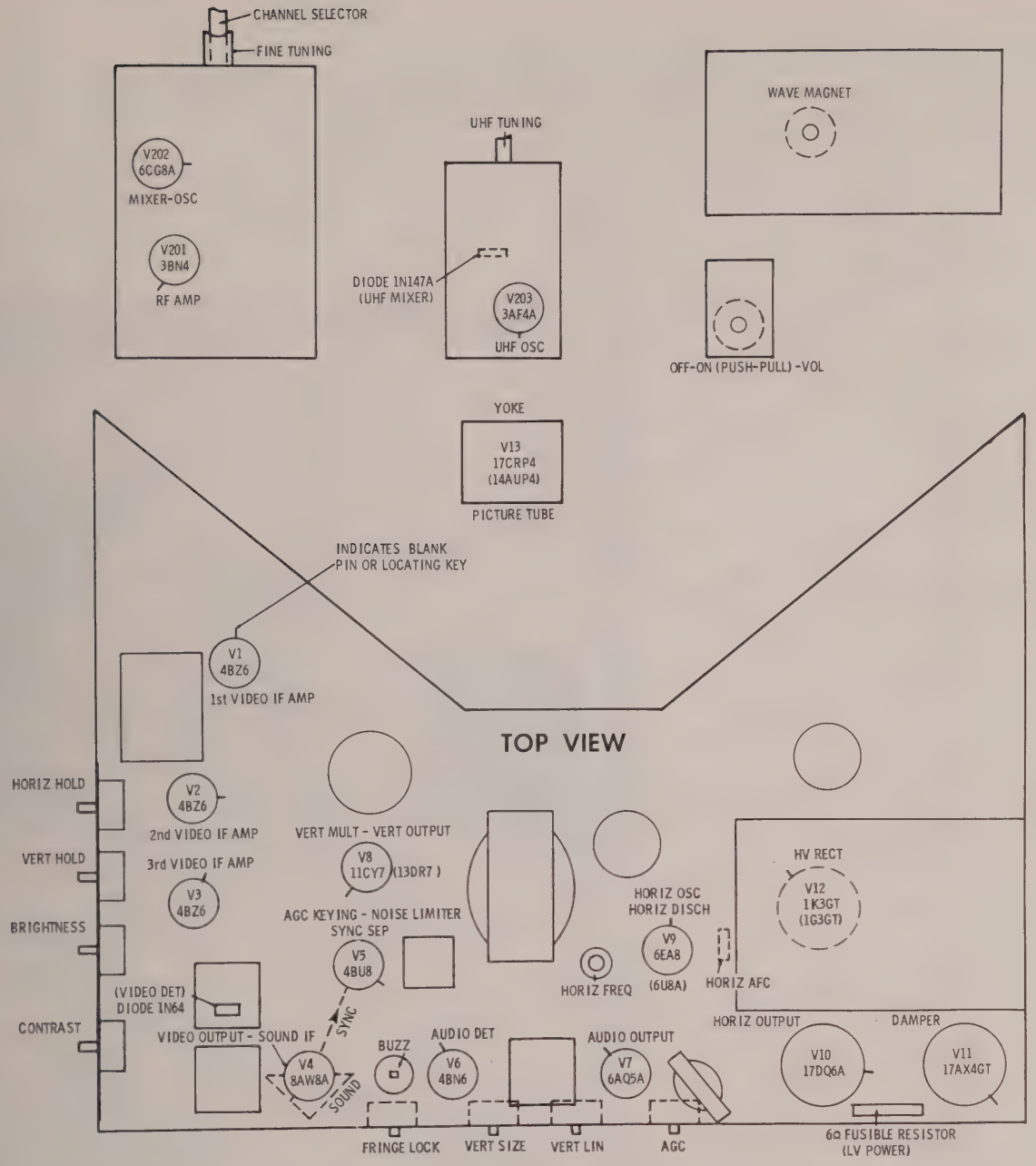
Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America


ZENITH CHASSIS
15B20, Q, U, UD
ADDITIONAL SCHEMATICS PAGE
TUNER 175-1 (UHF) 20
TUNER 175-5 (UHF) 8
TUNER 175-111 (VHF with UHF provisions) 8
TUNER 175-112 (VHF) 7
TUNER 175-113 (VHF with UHF provisions) 5
TUNER 175-114 (VHF) 7
ALTERNATE CIRCUITS USED IN "Q" CHASSIS) 5
DENOTES CHASSIS GROUND
SW ON VOLUME CONTROL
TO VHF ANT TERMINALS
260V SOURCE
145V SOURCE
140V SOURCE
620V BOOST
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1 DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
4. Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation; no signal applied
RF AGC
IF OUTPUT
UHF TUNER PARTS
UHF TUNER PART #175-1 TOP VIEW
SOUND IF
AUDIO DET
AUDIO OUTPUT
1ST VIDEO IF
2ND VIDEO IF
3RD VIDEO IF
VIDEO OUTPUT
AGC-KEYING-NOISE LIM TER-SYNC SEP
VERT MULT
VERT OUTPUT
HORIZ AFC
HORIZ OSC
HORIZ OUTPUT
HV RECT
DEFLECTION YOKE
PICTURE TUBE
CONTRAST
BRIGHTNESS
VOLUME
HORIZ HOLD
VERT HOLD
VERT SIZE
VERT LINEARITY
FRINGE LOCK
AGC
DAMPER
TAKEN WITH PIN 6 OF VERT MULT (V8A) SHORTED TO GROUND
DO NOT MEASURE
M0 BOTTOM VIEW
A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1959
ZENITH CHASSIS
15B20, Q, U, UD

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

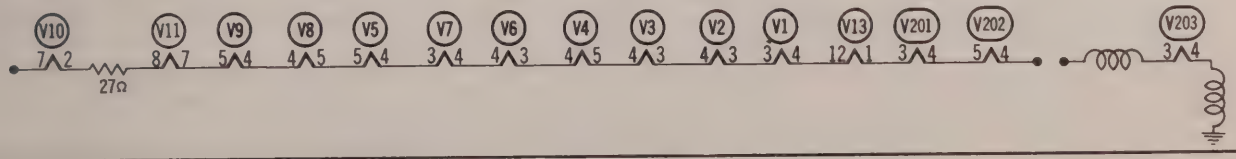
POWER SUPPLY FAILURE
No raster, no sound Fusible Resistor (6Ω), Rectifier (B+)

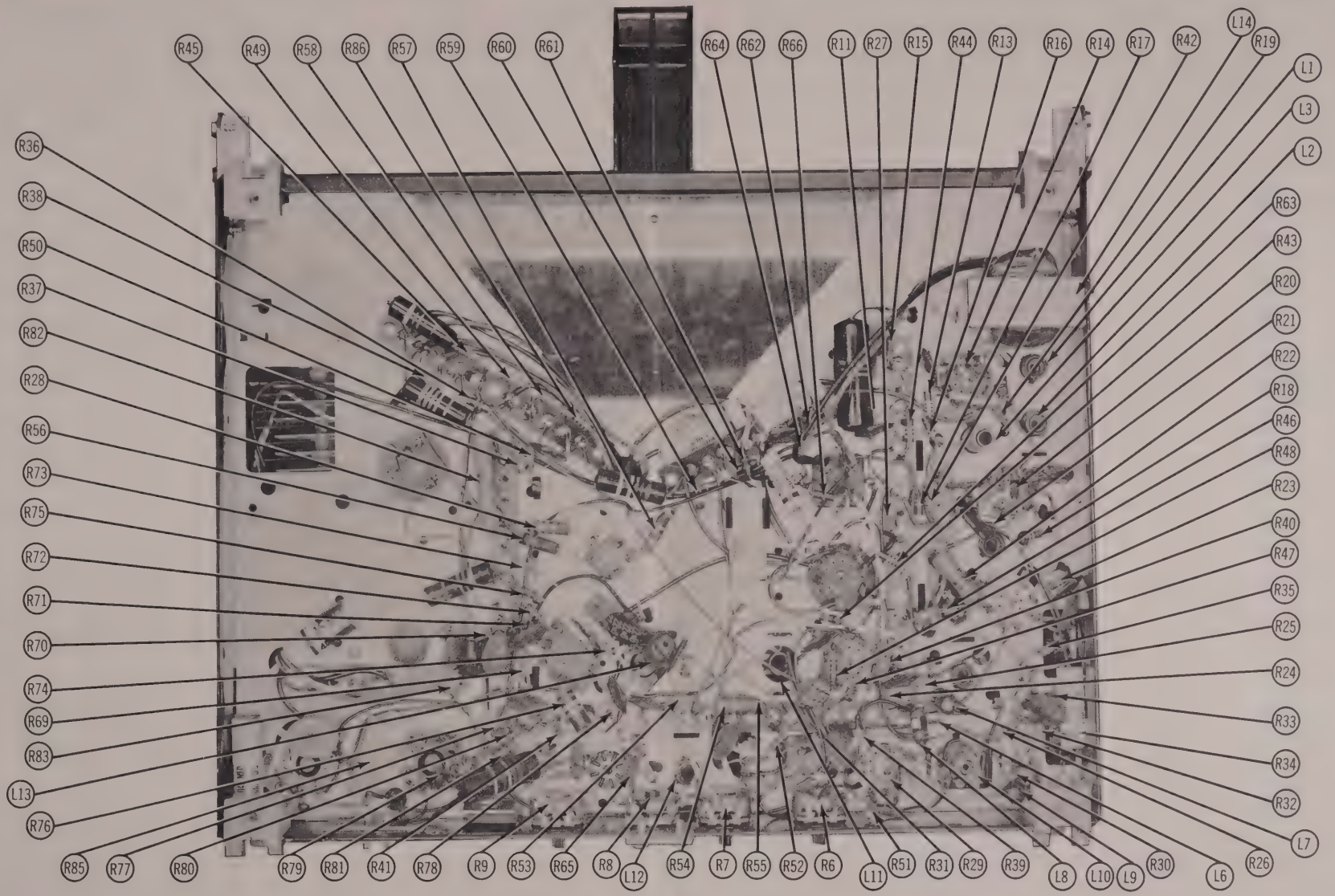
SWEEP FAILURE
No raster, has sound Rectifier (Horiz. AFC), V9, V10, V11, V12, V13
No vertical deflection V8
Poor vert. linearity or foldover V8
Poor horiz. linearity or foldover V9, V10, V11
Narrow picture V9, V10, V11, Rectifier (B+)
Vert. off freq. V8
Horiz. off freq. V9

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det), V4
No pic, no sound, has snow V201, V202, V1, (V203 UHF only)
No pic, has sound, has raster V4, V13
Has pic, no sound V4, V6, V7
Overloaded picture V5

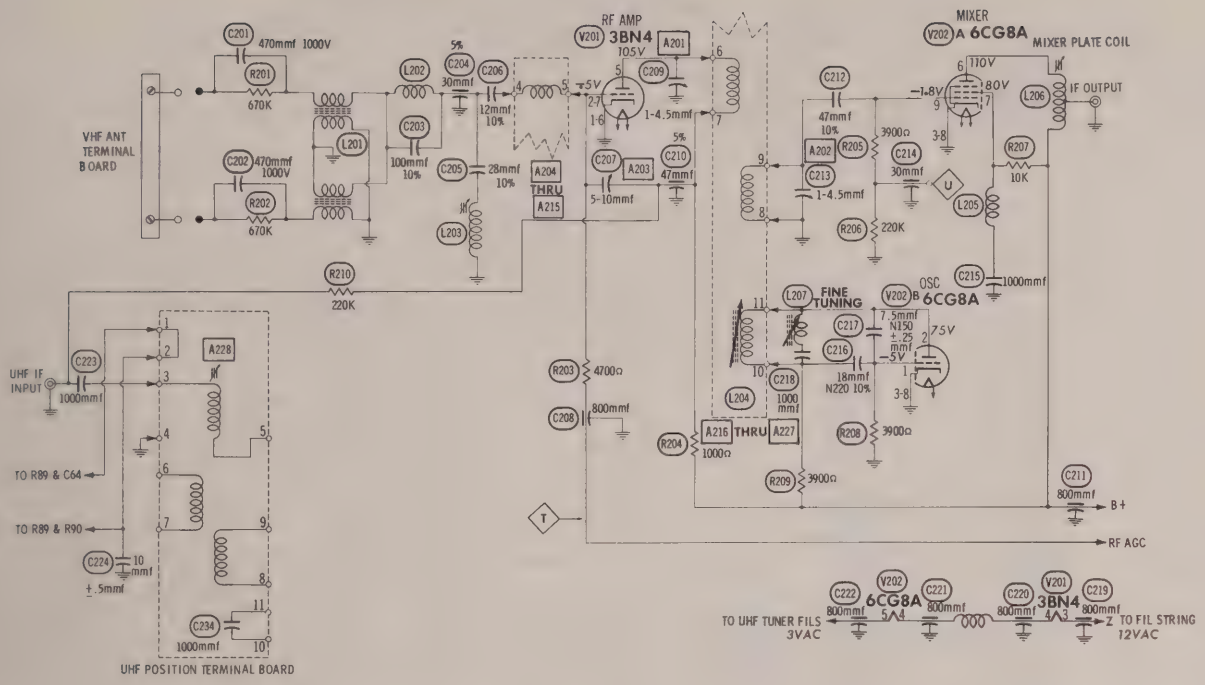
SYNC FAILURE
No vert. sync V5
No horiz. sync V5, Rectifier (Horiz. AFC)
No vert. or horiz. sync V5

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)





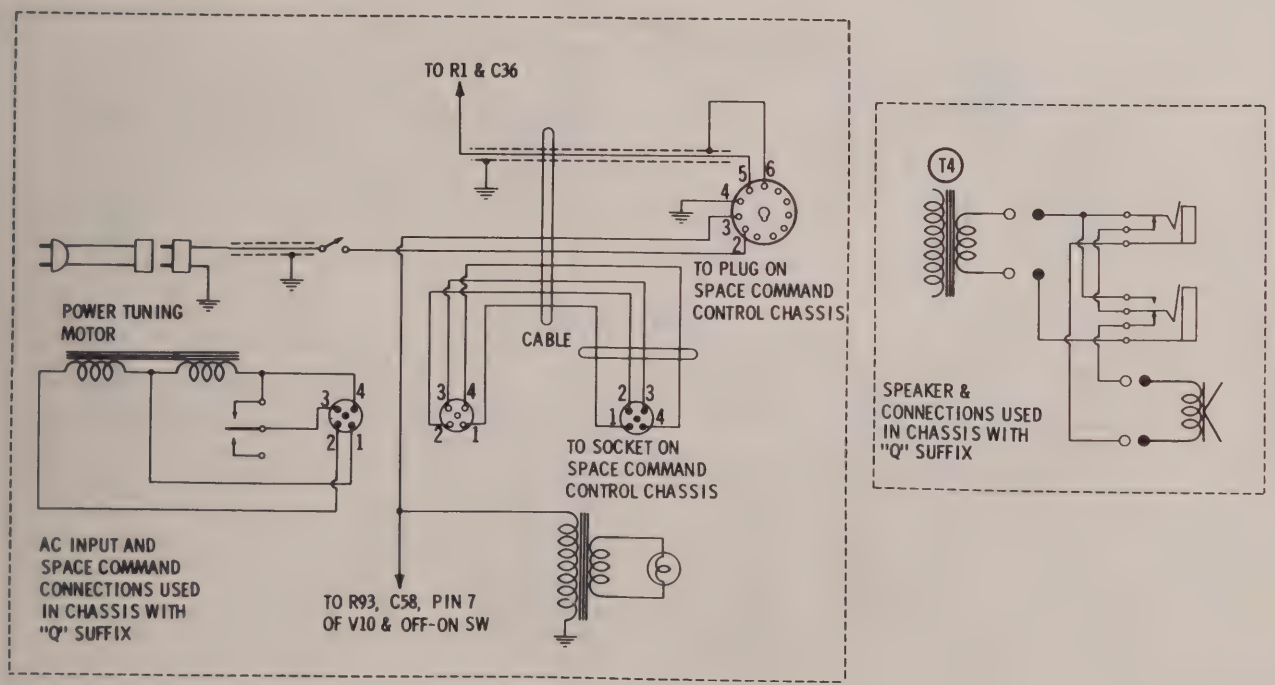
CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

VHF TUNER 175-113


TO R1 & C36
TO PLUG ON SPACE COMMAND CONTROL CHASSIS
POWER TUNING MOTOR
CABLE
TO SOCKET ON SPACE COMMAND CONTROL CHASSIS
AC INPUT AND SPACE COMMAND CONNECTIONS USED IN CHASSIS WITH "Q" SUFFIX
TO R93, C58, PIN 7 OF V10 & OFF-ON SW
T4
SPEAKER & CONNECTIONS USED IN CHASSIS WITH "Q" SUFFIX

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

ALTERNATE CIRCUITS "Q" CHASSIS

TUNER PARTS LIST AND DESCRIPTIONS

175-113, 175-1

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	3BN4	
V202	Mixer-Osc.	6CG8A	

ITEM No.	USE	TYPE	NOTES
V203	UHF Osc.	3AF4A	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	470	1000	22-61	BPD-00047	DD-471	L10T47	B-347	5GA-T47	
C202	470	1000	22-61	BPD-00047	DD-471	L10T47	B-347	5GA-T47	
C203	120		22-2922	BPD-00012	DD-121	L10T12	CNO-312	5GA-T12	10%
C204	30		22-2921						5%
C205	28		22-2920						10%
C206	12		22-2919						10%
C207	5-10		22-3006						
C208	800		22-2958	EF-001	MFT-1000			503C-D1	
C209	1-4.5		22-3009		829-4		CT551		
C210	47		22-3007						5%
C211	800		22-2958	EF-001	MFT-1000			503C-D1	
C212	47		22-2915						10%
C213	1-4.5		22-3009		829-4		CT551		
C214	30		22-2916						
C215	1000		22-2993	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C216	18		22-3025						N220 10%
C217	7.5		22-3026						N150 ±.25mmf
C218	1000		22-3024	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C219	800		22-2958	EF-001	MFT-1000			503C-D1	
C220	800		22-2958	EF-001	MFT-1000			503C-D1	
C221	800		22-2958	EF-001	MFT-1000			503C-D1	
C222	800		22-2958	EF-001	MFT-1000			503C-D1	
C223	1000		22-2959	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C224	10		22-2991		DTZ-10		CNO-410	5TCC-Q1	±.5mmf
C225	.82		22-3031						10%
C226	25		22-3075						
C227	.85-2.3		22-2453						
C228	1.0		22-3057						N2200 1%
C229	1.0		22-3051						N2200 1%
C230			69-308						
C231	250		22-3030						
C232	1000		22-3029	EF-001	MFT-1000			503C-D1	
C233	1000		22-3029	EF-001	MFT-1000			503C-D1	
C234	1000		22-2959	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ZENITH PART No.	NOTES
	OHMS	WATT		
R201	670K		63-4381	
R202	670K		63-4381	
R203	4700Ω			
R204	1000Ω			
R205	3900Ω			
R206	220K			
R207	10K			

ITEM No.	RATING		ZENITH PART No.	NOTES
	OHMS	WATT		
R208	3900Ω			
R209	3900Ω			
R210	220K			
R211	670K		63-4381	
R212	5600Ω			

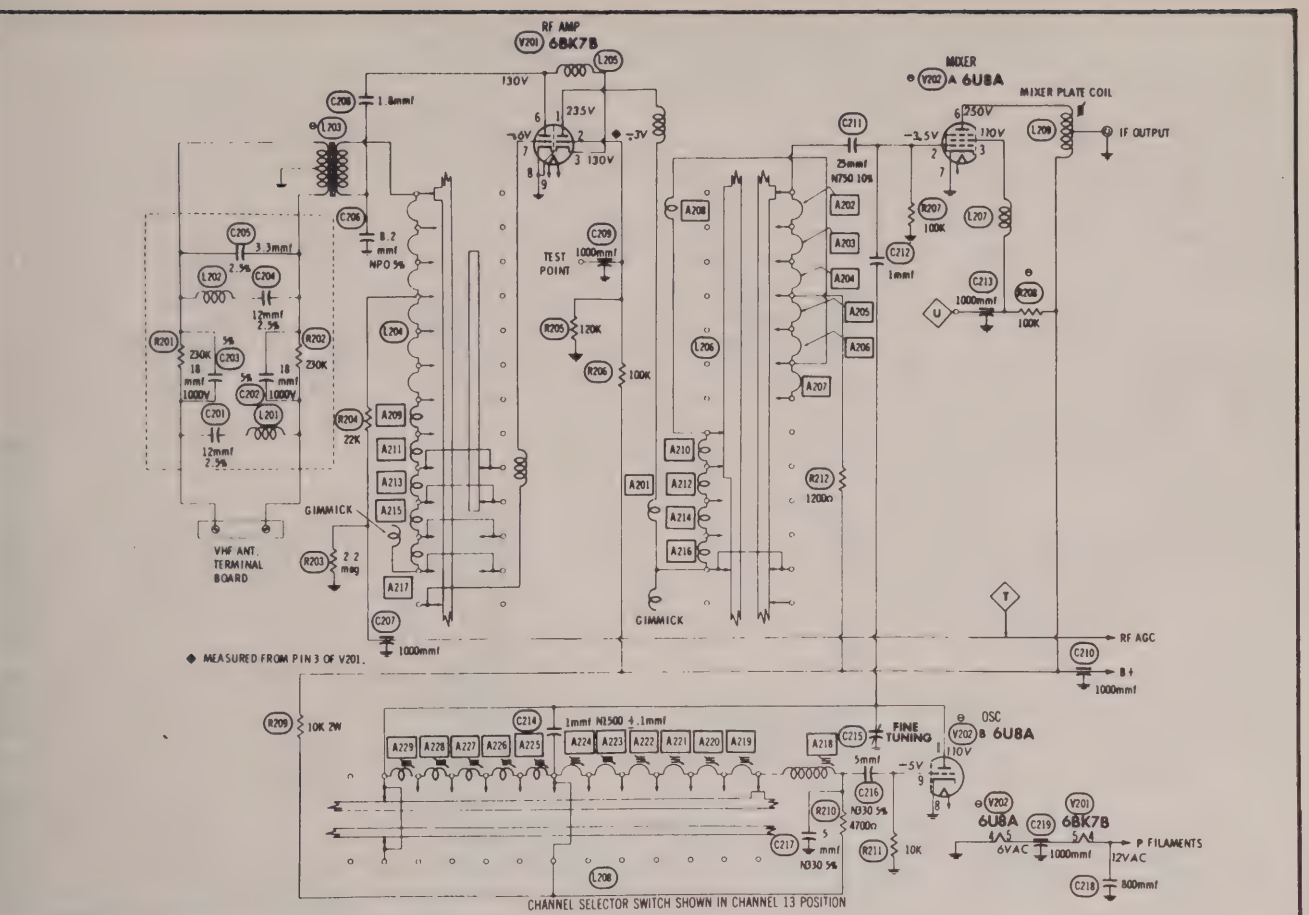
COILS (RF-IF)

ITEM No.	USE	ZENITH PART No.	NOTES
L201	VHF Ant. Trans.	S-40486	
L202	RF Choke	20-657	
L203	IF Trap Coil	S-40497	
L204A	Ant., RF, Mixer Grid, Osc. Coils	S-40472	Channel 2
B	"	S-40473	Channel 3
C	"	S-40474	Channel 4
D	"	S-40475	Channel 5
E	"	S-40476	Channel 6
F	"	S-40477	Channel 7
G	"	S-40478	Channel 8
H	"	S-40479	Channel 9
I	"	S-40490	Channel 10

ITEM No.	USE	ZENITH PART No.	NOTES
L204J	Ant., RF, Mixer Grid, Osc. Coils	S-40491	Channel 11
K	"	S-40492	Channel 12
L	"	S-40493	Channel 13
M	UHF IF Coils	S-41661	
L205	RF Choke	20-721	
L206	Mixer Plate Coil	S-43036	
L207	Fine Tuning Coil	20-733	
L208	UHF Ant. Coil	20-735	
L209	RF Choke	20-738	
L210	Cathode Choke	S-42999	
L211	Fil. Choke	20-736	

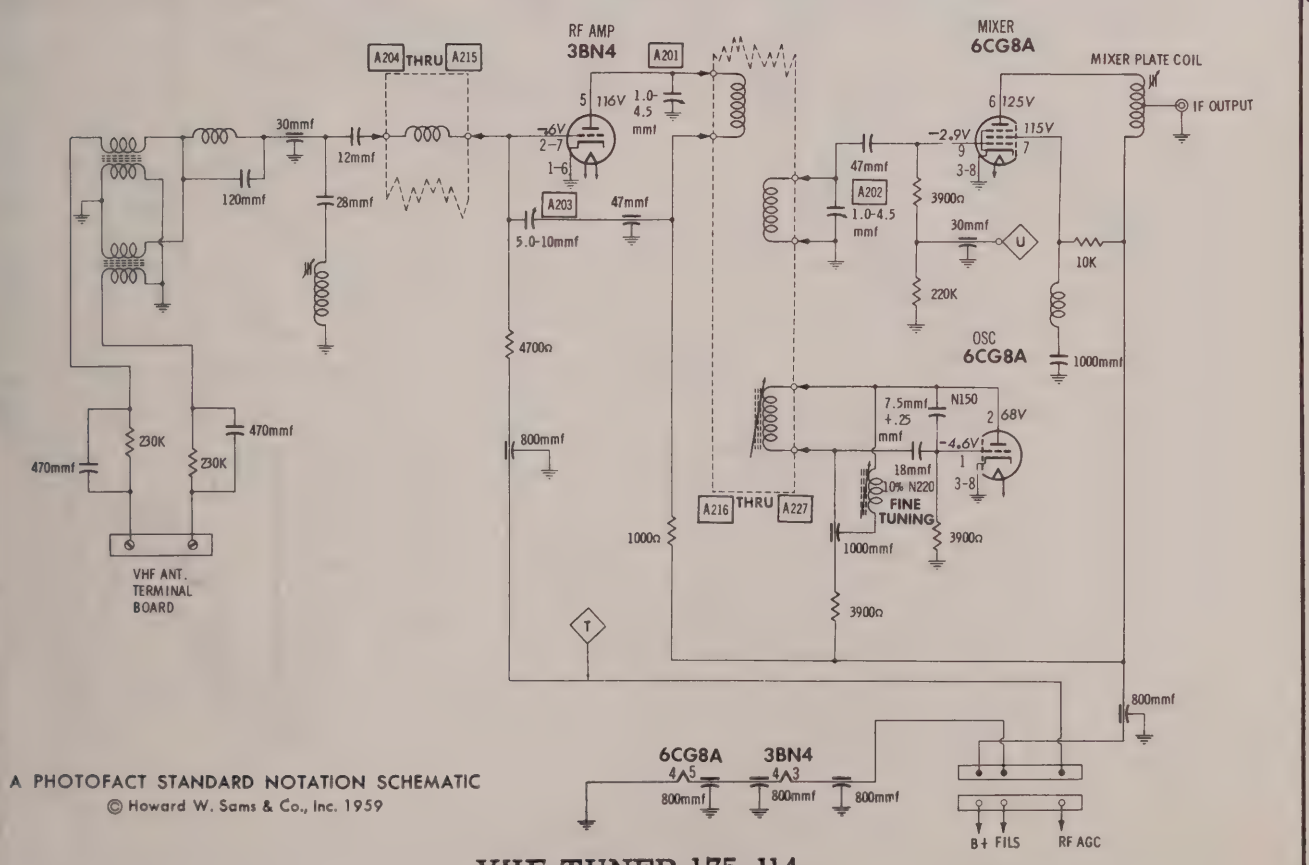
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ZENITH PART No.	CBS PART No.	SYLVANIA PART No.	
M201	1N147A	103-15	1N82A	1N82A	UHF Mixer (Pigtail)



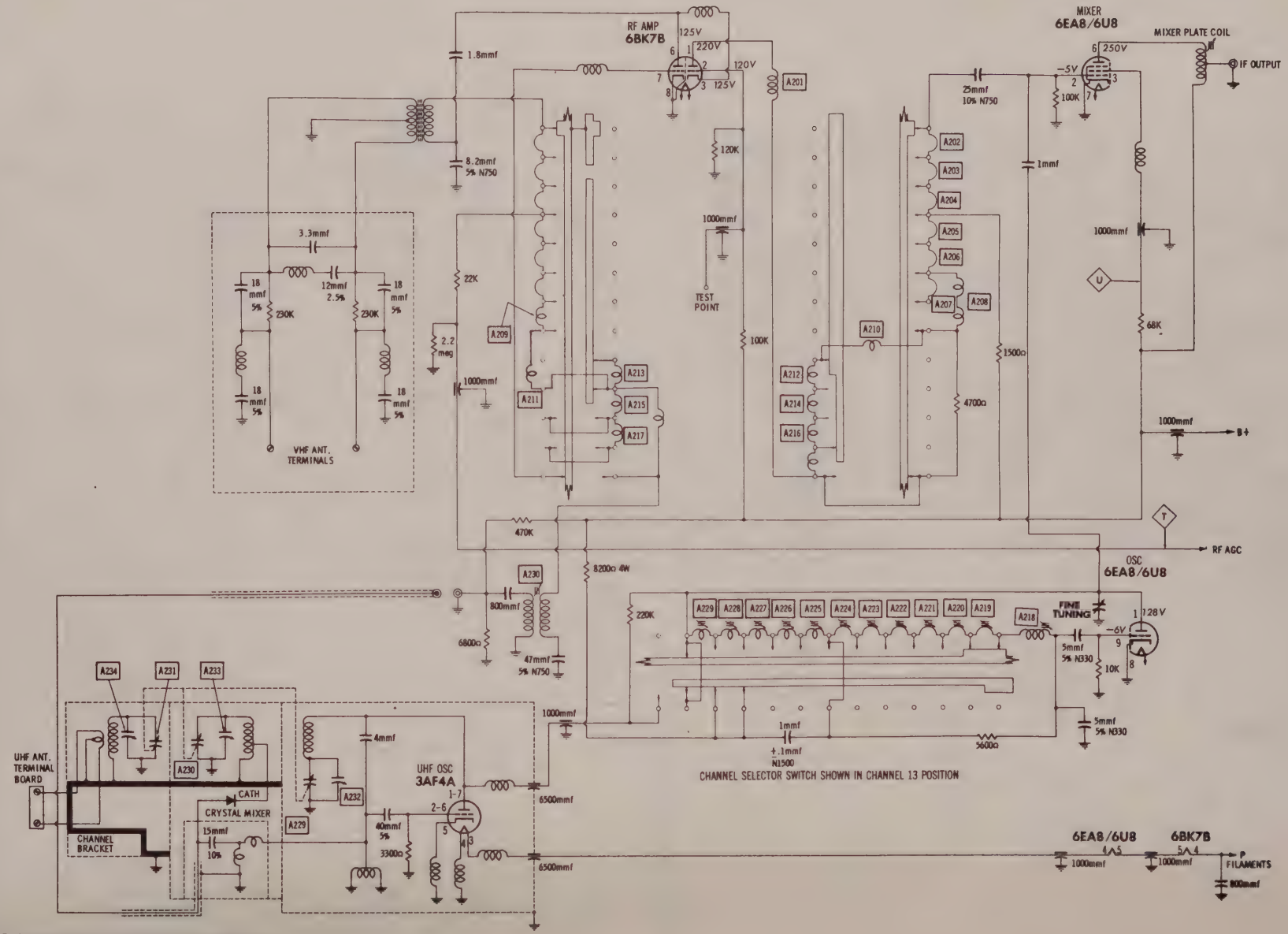
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1959

VHF TUNER 175-112



A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1959

VHF TUNER 175-114



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

VHF TUNER W/UHF PROVISIONS 175-111 & UHF TUNER 175-5

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER to PROTECT the Test Equipment.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: A1 thru A12.....General Cement #8606, 8606L, 8282, 9295
Walsco #2526, 543, 2544, 2545

VIDEO IF ALIGNMENT

Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470mmf	High side to TP1. Low side to chassis.	44.0MC (10MC Swp)	39.75MC 41.25MC 45.75MC	Between any two channels	Vert. Amp. thru 10K to point (A). Low side to chassis. (Across Video Det. load)	A1, A2	Set sweep generator output to produce 3 volts peak to peak on scope. Adjust A1 and A2 alternately for maximum gain and symmetry with the 45.75MC marker positioned as shown in Fig. 1. The 39.75MC marker can fall within ± .5MC of the specified frequency. If the desired response cannot be obtained, check to see that the cores are entering their respective windings from opposite ends of coils.
2.	Direct	High side to ungrounded shield floating over Mixer-Osc. tube (V202). Low side to chassis.	"	39.75MC 41.25MC 47.25MC	"	"	A3, A4, A5	Connect a clip lead from point (B) to chassis Connect a clip lead from point (C) to point (D). Use high scope and adjust A3 thru A5 for MINIMUM marker amplitudes as in Fig. 2. A3 controls the 39.75MC marker, A4 controls the 41.25MC marker and A5 controls the 47.25MC marker.
3.	"	"	"	41.25MC 42.75MC 45.0MC 45.75MC	"	"	A6, A7, A8, & Mixer Plate Coil	Disconnect the clip lead from point (D) and connect to chassis. Adjust for maximum gain and symmetry of response similar to Fig. 3 with markers as shown. A6 affects the low frequency side of the curve and A7 affects the high frequency side.

SOUND IF ALIGNMENT

Connect an adjustable attenuator between the antenna and receiver terminals. Tune in a TV station and adjust the attenuator until the signal is below the limiting level of the 4BN6 (V6) as evidenced by a hiss similar to super-regeneration in the sound. Adjust A9, A10, A11, and A12 for maximum sound and best quality. Adjust the Buzz control (R10) for MINIMUM buzz. If the hiss disappears during alignment, further reduce the signal until the hiss returns.

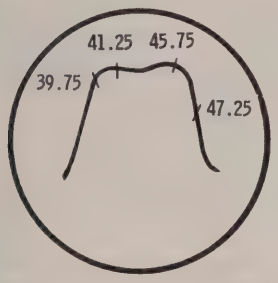


FIG. 1

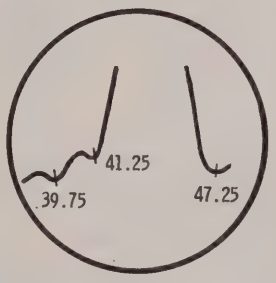


FIG. 2

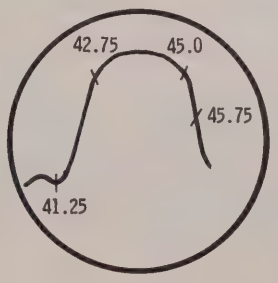


FIG. 3

TUNER ALIGNMENT INSTRUCTIONS LOCATION
175-111, 175-112 .....PAGE 10
175-113, 175-114 .... PAGE 15
175-1, 175-5 ..... PAGE 16

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS FOR TUNERS 175-111 & 175-112

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

Suggested alignment tools:

A201, A202, A203, A230	General Cement 5000, 5003, 5009, 8290 Walsco 2515, 2520, 2523, 2525, 2537
A216 thru A227	General Cement 8607, 9294 Walsco 2538
A228	General Cement 8606, 8606L, 8282, 9295 Walsco 2526, 2543, 2544, 2545
A229.....	General Cement 9050L, 9150 Walsco 2521

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 2.5 volt bias supply to point Ⓣ . Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	50-300Ω Matching Trans.	Across antenna terminals thru matching trans.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point Ⓤ . Low side to chassis.	A201, A202, A203	Adjust A201 and A202 for maximum amplitude and symmetry with markers as shown in Fig. 201. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A203 to obtain MINIMUM response on the scope.
2.	"	"	213MC	211.25MC 215.75MC	13	"	A204	Adjust for maximum amplitude of response similar to Fig. 201. Adjust by expanding or compressing coil turns.
			207MC	205.25MC 209.75MC	12		A205	
			201MC	199.25MC 203.75MC	11		A206	
			195MC	193.25MC 197.75MC	10		A207	
			189MC	187.25MC 191.75MC	9		A208	
			183MC	181.25MC 185.75MC	8		A209	
			177MC	175.25MC 179.75MC	7		A210	
			85MC	83.25MC 87.75MC	6		A211	
			79MC	77.25MC 81.75MC	5		A212	
			69MC	67.25MC 71.75MC	4		A213	
			63MC	61.25MC 65.75MC	3		A214	
			57MC	55.25MC 59.75MC	2		A215	

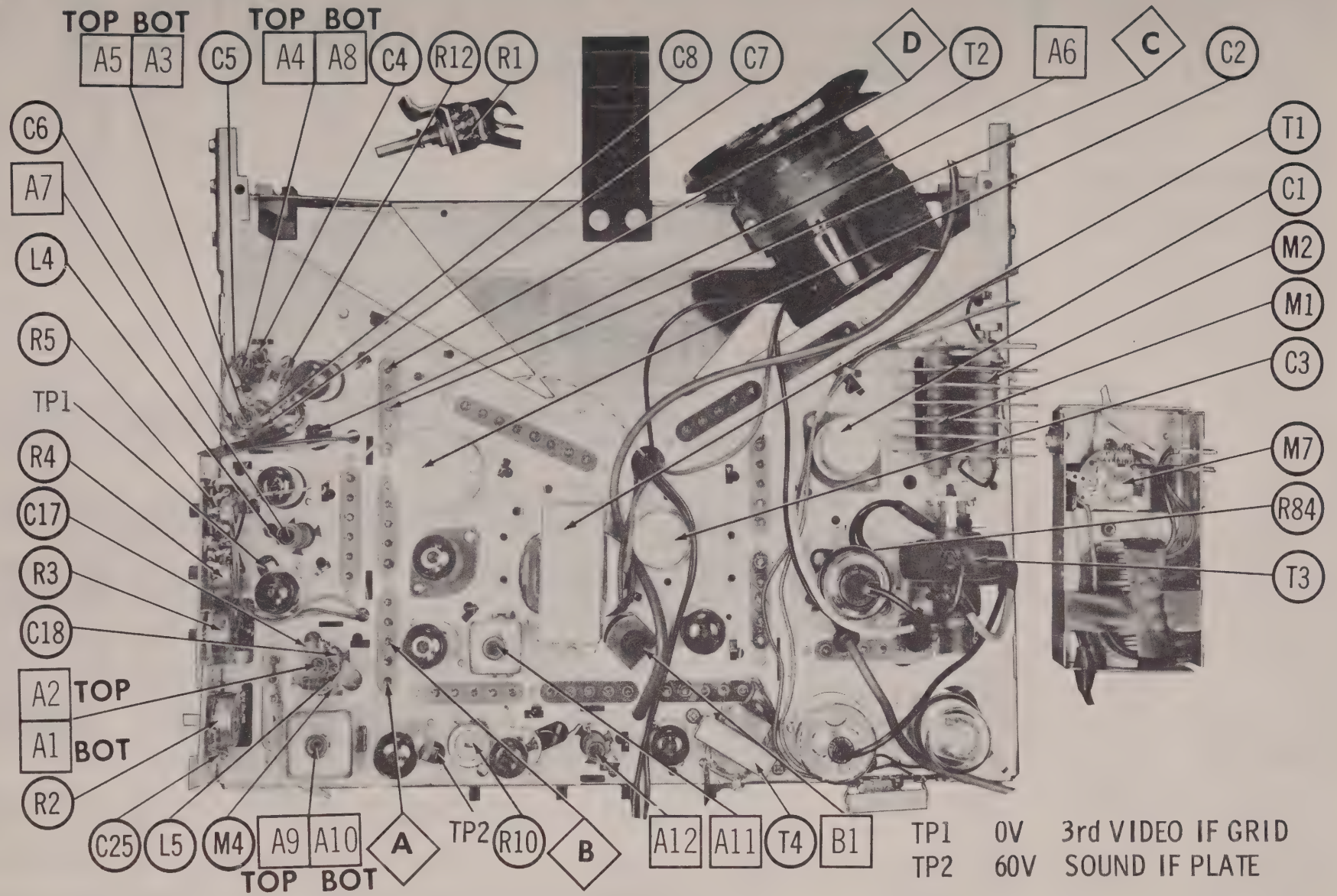
VHF OSCILLATOR ALIGNMENT

Connect the negative lead of a 2.5 volt bias supply to point Ⓣ . Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Detector load.	A216	Adjust to place sound marker in trap notch as in Fig. 202. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A217	
			201MC	199.25MC 203.75MC	11		A218	
			195MC	193.25MC 197.75MC	10		A219	
			189MC	187.25MC 191.75MC	9		A220	
			183MC	181.25MC 185.75MC	8		A221	
			177MC	175.25MC 179.75MC	7		A222	
			85MC	83.25MC 87.75MC	6		A223	
			79MC	77.25MC 81.75MC	5		A224	
			69MC	67.25MC 71.75MC	4		A225	
			63MC	61.25MC 65.75MC	3		A226	
			57MC	55.25MC 59.75MC	2		A227	

UHF IF ALIGNMENT

4. Adjust A228 for the most satisfactory picture with MINIMUM noise on any UHF station.



CHASSIS TOP VIEW

ZENITH CHASSIS
15B20, Q, U, UD

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp	4BZ6	
V2	2nd Video IF Amp.	4BZ6	
V3	3rd Video IF Amp	4BZ6	
V4	Video Output-Sound IF Amp.	8AW8A	
V5	AGC Keying-Noise Limiter-Sync Sep.	4BU8	
V6	Audio Det.	4BN6	
V7	Audio Output	6AQ5A	
V8	Vert Mult - Vert. Output	11CY7	13DR7 *
V9	Horiz. Osc. -Horiz. Disch.	8EA8	6U8A *
V10	Horiz. Output	17DQ8A	
V11	Damper	17AX4GT	
V12	HV Rect.	1K3GT	1G3GT *

* Alternate.

PICTURE TUBE

ITEM No	REPLACEMENT DATA: ZENITH PART No	GENERAL ELECTRIC PART No	RCA PART No	SYLVANIA PART No	NOTES
V13	17CRP4 ① 14AUP4 ①			17CRP4 ① 14AUP4 ①	① Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING CAP.	RATING VOLT	REPLACEMENT DATA: ZENITH PART No	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	140	150	22-3745	AFH3I-23	XA0326	FP117	TMS-24	D-086	TVL-1432
C2A	a140	300	22-3021	AFH3I-29-83	C0734.3	FP336.7		Q-232	TVL2-3574.8*
B	a100	300						MT-4580	
C	a100	50							
C3A	a4	350	22-2744	AFH3-180	C1445	FP345.2		T-810	TVL-3806.6
B	a10	400							
C	20	25							

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	470	1000	22-8	HVD-15-470	DD-471	BYA10T47	B-347	10GA-T47	
C5	4		22-3549			C10V4C		5TCCB-V4S 5% *	NPO 5%
C6	10000		22-3	BPD-01	DD-103	BYA10S1	B-110	5SK-S1	
C7	13		22-3279						N75 5%
C8	12		22-3279						N75 5%
C9	.33	200	22-3159	P388N-33		CUB6S3	GEM-3033	4TM-S3	
C10	10000		22-3	BPD-01	DD-103	BYA10S1	B-110	5SK-S1	
C11	470		22-16	DI-470	DD-471	BYA10T47	JL-347	5GA-T47S 10% *	10%
C12	1000	1000	22-17				JL-110	5GA-D1S 10% *	10%
C13	220		22-3236	1469-00022	MD-221	22R5T22		M3-322	10%
C14A	4700	1000	22-24				JL-347	10GA-D4T8 10% *	10%
B	4700	1000					JL-347	10GA-D4T8 10% *	10%
C15	470		22-3022	1467-00047		5R5T47		M8-347	10%
C16	470		22-16	DI-470	DD-471	BYA10T47	JL-347	5GA-D4T8 10% *	10%
C17	5		22-2990						N470 5%
C18	7.5		22-3742					5TCCB-V7S8*	
C19	10000		22-3	BPD-01	DD-103	BYA10S1	B-110	5SK-S1	
C20	4700		22-14	DI-4700			JL-347	5GA-D4T8 10% *	10%
C21	47		22-3467		TCZ-47	C10Q47C	CNO-447	5GA-Q4T8 5% *	5%
C22	3.3		22-3343	NPO-SI 3.3	TCZ-3R3	L10Y33	ZT-5S33	5TCCB-V3J	
C23	50		22-3460	SI 50	D6-500	L10Q5	UC-545	5TCC-Q5	
C24	470	1000	22-6	HVD-15-470	DD-471	BYA10T47	B-347	10GA-T47	
C25	50		22-3460	SI 50	D6-500	L10Q5	UC-545	5TCC-Q5	
C26	.1	200	22-1777	P388N-1		CUB2P1	GEM-301	2TM-P1	
C27	10000		22-3	BPD-01	DD-103	BYA10S1	B-110	5SK-S1	
C28	1000	1000	22-17				JL-110	10GA-D1S 10%*	10%
C29	3300		22-11	DI-3300	DD-302	BYA10D33	B-233	5GA-D33	
C30	10000		22-3	BPD-01	DD-103	BYA10S1	B-110	5SK-S1	
C31	2.4		22-3596		TCZ-2R5			5TCCB-V2S8 5% *	5%
C32	10		22-3411						10%
C33	1500		22-13	DI-1500			JL-215	5GA-D1S8 10% *	10%
C34A	1000		22-21	DI-1000			JL-110	5GA-D1S 10% *	10%
B	1000			DI-1000			JL-110	5GA-D1S 10% *	10%
C35	7.5		22-3742					5TCCB-V7S8 *	
C36	10000		22-3	BPD-01	DD-103	BYA10S1	B-110	5SK-S1	
C37	2200		22-3	BPD-0022	DD-222	BYA10D22	B-222	5HK-D22	
C38	.022	400	22-2621	P488N-022		CUB4S22	GEM-4122	4TM-S22	
C39	.1	600	22-1841	P488N-1		CUB6P1	GEM-601	6TM-P1	
C40	.1	400	22-2061	P488N-1		CUB4P1	GEM-401	4TM-P1	
C41	.01	200	22-2565				GEM-1611	2WF-S10	10%
C42	.015	1000	22-3040	P1088N-015				10TM-S15S 10% *	10%
C43	.033	400	22-2635	P488N-033			GEM-1613	5BF-S33	10%
C44	.047	200	22-1778	P388N-047		CUB2S47	GEM-4147	2TM-S47	
C45A	51	1000	22-25		DD-500			10GA-Q5	
B	51	1000			DD-500			10GA-Q5	
C46A	1000		22-21	DI-1000			JL-110	5GA-D1S 10% *	10%
B	1000			DI-1000			JL-110	5GA-D1S 10% *	10%
C47	.047	200	22-1778	P388N-047		CUB2S47	GEM-4147	2TM-S47	
C48	1000	1000	22-17				JL-110	10GA-D1S 10% *	10%
C49	680					1R5T68		M5-368	10%
C50	470	1000	22-6	HVD-15-470	DD-471		B-347	10GA-T47	
C51	3300		22-3023			1R5D33		M5-333	10%
C52A	1500						JL-215	5HK-D1S8 10% *	10%
B	1500		22-23				JL-215	5HK-D1S8 10% *	10%
C53	10000		22-3	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C54	4700		22-14	BPD-0047	DD-472	BYA10D47M	B-347	5HK-D47	
C55	.15	400	22-2261	P488N-15		CUB4P15	GEM-4015	4TM-P15	
C56	145	4000	22-2869					50GA-T14S8 10% *	10%
C57	56			DI-56	DD-560	L10Q56	CNO-456	5GA-Q5S8 10% *	10%
C58	.1	400	22-2061	P488N-1		CUB4P1	GEM-401	4TM-P1	
C59	1000		22-7	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C60	470	1000	22-8	HVD-15-470	DD-471	BYA10T47	B-347	10GA-T47	
C61	.047	600	22-1844	P688N-047		CUB6S47	GEM-6147	6TM-S47	
C62	10000	1400	22-2855	DAC-27	DDS6-103	CUB1S3	2HV-110	20HK8-S1	
C63	800		22-2331	BPD-0008	DD-801	L10T8		5GA-T8	
C64	470	1000	22-6	HVD-15-470	DD-471		B-347	10GA-T47	

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: ZENITH PART No	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	1meg	½	63-4082				PP16L	Volume & Switch
R2	30K	½	63-4075					Contrast, Tap @ 20K
R3A	250K	½	63-4049	B-50	A47-250K-S	Q1-130	TA354L	Brightness
B	Shaft			Not Req.	KB8-3	Not Req.	Not Req.	
R4A	750K	½	63-3363	AB-66	A47-750K-S	Q1-136	PTA754L	Vert. Hold
B	Shaft			AK-19	RN-3	TQ	Not Req.	
R5A	100K	½	63-4090	AB-40	A47-100K-S	Q1-138	PTA15L	Horiz. Hold
B	Shaft			AK-19	RN-3	TQ	Not Req.	
R6A	5meg	½	63-4060	AB-87	A47-5meg-S	Q1-141	PTA56L	Fringe Lock
B	Shaft			AK-19	RN-3	TQ	Not Req.	
R7A	7.5meg	½	63-4061	AB-89	A47-7.5meg-S	Q1-142	PTA75L	Vert. Size
B	Shaft			AK-19	RN-3	TQ	Not Req.	
R8A	3000Ω	1	63-4051	AB-8	A47-3000-S	Q1-112	PTA352L	Vert. Lin.
B	Shaft			AK-19	RN-3	TQ	Not Req.	
R9A	750K	½	63-3262	AB-66	A47-750K-S	Q1-136	PTA754L	AGC
B	Shaft			AK-19	RN-3	TQ	Not Req.	
R10	750Ω	1	63-3284		39-800-50			Buzz

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R1	2.2meg		63-1926	
R2	22K		63-1941	
R3	33K		63-1848	
R4	56Ω		63-1736	
R5	1500Ω		63-1793	
R6	120K		63-1873	
R7	120K		63-1873	
R8	15K		63-1834	
R9	220Ω		63-1758	
R10	27Ω		63-1719	
R21	220Ω		63-1758	
R22	4700Ω	3	63-4370	
R23	120Ω		63-1747	
R24	4700Ω		63-1813	
R25	68K		63-1862	
R26	2.2meg		63-1925	
R27	330Ω		63-1785	
R28	33K	1	63-057	
R29	47Ω		63-1729	
R30	39K		63-1852	
R31	100K		63-1870	
R32	68K		63-1862	
R33	1800Ω		63-1796	
R34	10K	1	63-1071	
R35	180K		63-1880	
R36	56K 5%		63-1858	
R37	27K		63-1845	
R38	180K		63-1880	
R39	470K		63-1898	
R40	100K		63-1869	
R41	220K		63-1883	
R42	3.3meg		63-4374	
R43	1meg		63-1911	
R44	470K		63-1898	
R45	220K		63-1883	
R46	10K	1	63-4420	
R47	47K		63-1855	
R48	6.8meg		63-4078	
R49	82K		63-1865	
R50	18K		63-1839	

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R51	100K		63-1870	
R52	680Ω		63-1779	
R53	390K		63-1894	
R54	22K	2	63-1566	
R55	10K		63-1827	
R56	1000Ω	1	63-965	
R57	680Ω	1	63-2290	
R58	22K		63-2846	
R59	3.3meg		63-4080	
R60	1000Ω		63-1786	
R61	2.2meg		63-4077	
R62	68K		63-1862	
R63	180K		63-1880	
R64	82K		63-1866	
R65	1200Ω	1	63-3190	
R66	8200Ω		63-1824	
R67	390Ω			
R68	390Ω			
R69	330K		63-1890	
R70	330K		63-1890	
R71	1meg		63-1911	
R72	220K		63-1883	
R73	47K		63-1855	
R74	100K		63-1869	
R75	4.7meg		63-4423	
R76	120K	2	63-2309	
R77	15K		63-2372	
R78	47K		63-1855	
R79	100Ω		63-1744	
R80	1meg		63-1912	
R81	100Ω		63-1744	
R82	15K	4	63-2658	
R83	100K		63-1869	
R84	2.2Ω	1	63-2114	
R85	27Ω	7	63-1972	
R86	33K		63-4008	
R87	670K		63-4381	
R88	2700Ω	2	63-4075	
R89	220K		63-1883	
R90	8200Ω	4	63-3402	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No	Meissner PART No	Merit PART No	Miller PART No	Ram PART No	NOTES
L1A	1st Video IF	S-43891					Includes C4 & C5 ①
B	41.25MC Trap						
L2A	39.75MC Trap	S-41883					
B	47.25MC Trap						
L3	2nd Video IF	S-42874	17-4523 *	TV-130 *	6224 *	VF-3 *	
L4	3rd Video IF	S-41891	17-4523 *	TV-130 *	6224 *	VF-3 *	
L5	4th Video IF	S-43734 †					
L6	Series Peaking Coil	S-43615	19-3125	TV-195	6153	VP-4	120 Microhenries
L7	Shunt Peaking Coil	S-43616	19-3126	TV-195	6153	VP-4	110 Microhenries
L8	Resonant Choke	S-21888					6.7 Microhenries
L9	Series Peaking Coil	S-20880	19-3125 ▲		6153 ▲		137 Microhenries, wound on 18K resistor
L10	1st Sound IF	S-42872					
L11	2nd Sound IF	S-42347					③
L12	Quadrature Coil	S-19020	20-1005 *	TV-121 *	1480 *		

† Part of 4th IF Assembly (Part #S-43622).
* Drill new mounting hole.
▲ Parallel with 18K resistor.

① Alternate Part #S-43892.
③ Alternate Part #S-42875.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: ZENITH PART No	Meissner PART No	Merit PART No	Miller PART No	Ram PART No	Thordarson PART No	NOTES
L13	88Ω		S-44279		TV-165	6211		HS-7	Horiz. Freq.

FILTER CHOKE

ITEM No.	RATINGS CURRENT (Measured)	RATINGS DC RES.	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L14	.240A	63Ω	.4 Hy.	95-1581						

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA: ZENITH PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	49-858	4A07	

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No	Halldorson PART No	Merit PART No.	Ram PART No.	Rogers PART No.	Stancor PART No	Thordarson PART No	Triad PART No
T1	Vert. Output	95-1593	Z1900 ①②	A-2823 ③	V-307 ①②		VO-100 ③	26373 ③	A-118X ③
T2	Yoke-Horiz. (128MH) (90°)-Vert. (38MH)	95-1579	DF606 ④⑤	MDF-91 ④⑤	Y90P12/47 ④⑤		DY-12A 4 5	Y-39 4 6	Y-40 & NW11
	Rear Cover & Centering Device	8-43091							YC-1
	Alt. Rear Cover & Centering Device	8-23257							YC-1
T3	Horiz. Output	8-42878							

① Connect as autoformer.
② Use 8 : 1 turns ratio.
③ Drill new mounting hole(s).
④ Use original yoke damping network, if necessary.
⑤ Use original rear cover and centering device. Cut and form a piece of .010 gauge fish paper inside the yoke itself and support with an acetate cement to provide an insulation between the width sleeve and the yoke proper.
6 Connect yoke terminal #2 to terminal #4 of T3, yoke terminal #7 to terminal #3 of T3

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: ZENITH PART No	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T4	9700Ω	3-4Ω	95-1534	Z1117 ①	A-2932 ①		A-3879 ①	24883	S-11X	① Drill new mounting hole.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ZENITH PART No	REPLACEMENT DATA
K1	Vert. Integrator		87-5	
K2	Vert. Coupling		87-4	

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA: ZENITH PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.240A	212-14 1	1236AH 1	1N1007 3	T300 1	300 1	1 Selenium Type.
					TV500 2	40K 2	2 Silicon Type
M2	.240A	212-14 1	1236AH 1	1N1007 3	T300 1	300 1	3 Germanium Type.
					TV500 2	40K 2	4 Used
M3		103-20 1	K1615 1		SD-91 2 4		

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: ZENITH PART No.	CBS PART No.	SYLVANIA PART No.	NOTES
M4	1N84	103-23	1N84	1N295	Video Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M5	Tuner	175-113	VHF with UHF Provisions Ch. 15B20U, UD
	Tuner	175-111	VHF with UHF Provisions Ch. 15B20U, UD
	Tuner	175-112	VHF Ch. 15B20
	Tuner	175-114	VHF Ch. 15B20, Q
M6	Tuner	175-1	UHF Ch. 15B20U
	Tuner	175-6	UHF Ch. 15B20UD
M7	Switch		Antenna (Rotary Wafer Type)
M8	Width Sleeve		

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

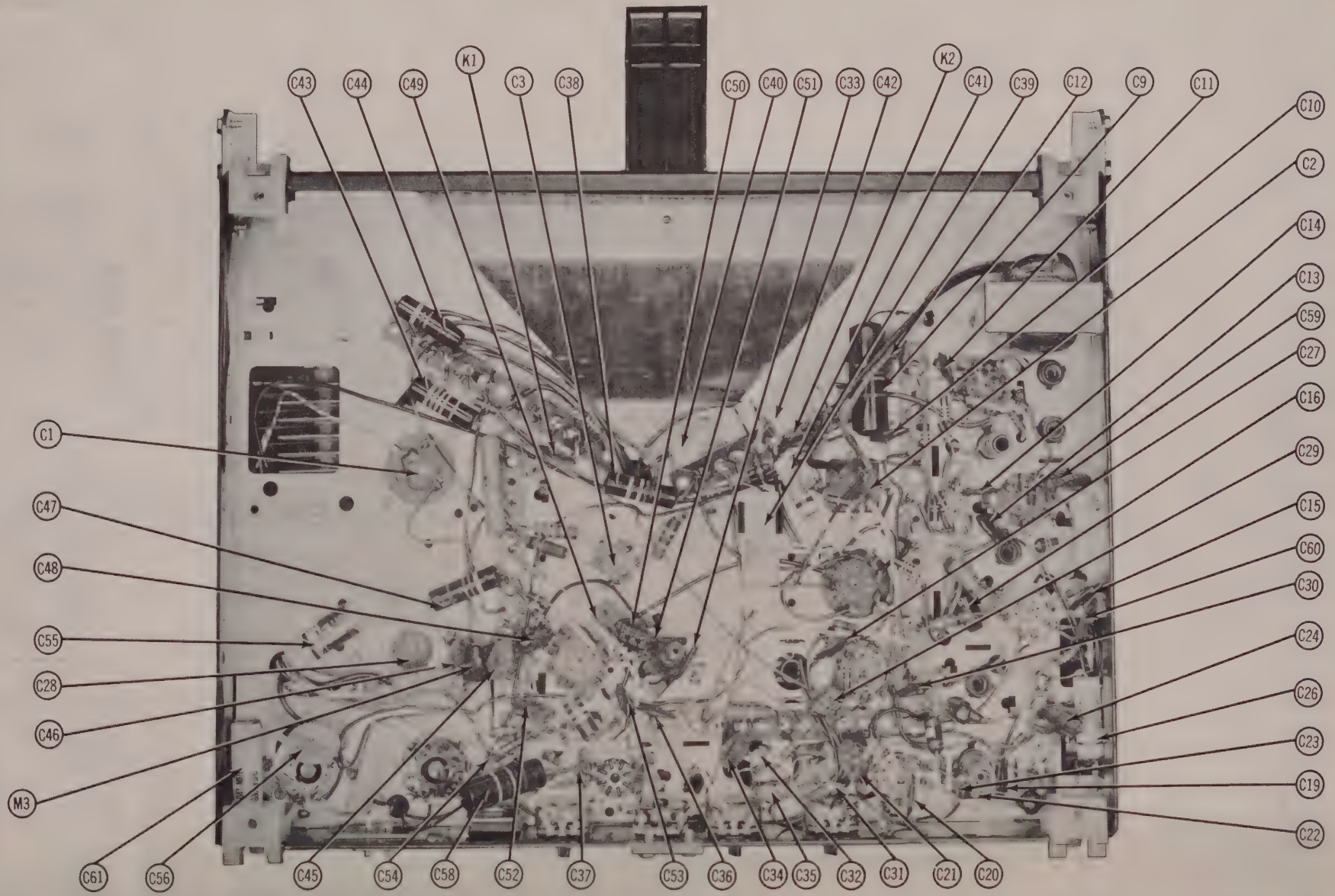
NAME	PART NO.	DESCRIPTION
Safety Glass	192-257	Models B1410L, LU, LUD
Safety Glass	192-246	Models B1410LZ, LZU, LZUD
Safety Glass	192-258	Models B14UP, PU, PUD, B1413G, GU, GUD, B1413G, GU, GUD
Safety Glass	192-247	Models B14UPZ, PZU, PZUD
Safety Glass	192-249	Models B1715L, LU, LUD
Safety Glass	192-259	All 17" Models except B1715L, LU, LUD
Knob	46-1962	Channel Selector, Models B1410L, LU, LUD, B1410LZ, LZU, LZUD
Knob	46-1963	Channel Selector, All 14" Models except B1410L, LU, LUD, B1410LZ, LZU, LZUD
Knob	46-2075	Channel Selector, Models B1715L, LU, LUD
Knob	46-2004	Channel Selector, Models B1716C, CU, CUD; B1717J, JU, JUD, B1718B,BU,BUD
Knob	46-2003	Channel Selector, Models B1715P, PU, PUD, B1720C, CU, CUD
Knob	53-4823	Channel Selector, Models B1715P, PU, PUD, B1720C, CU, CUD
Knob	53-40431	Fine Tuning, 14" Models
Knob	53-43039	Fine Tuning, Models B1715L, LU, LUD
Knob	53-43798	Fine Tuning, All 17" Models except B1715L, LU, LUD
Knob	53-43561	UHF Dial, 14" Models
Knob	53-43927	UHF Dial, 17" Models
Knob	46-1960	Volume, Models B1410L, LU, LUD, B1410LZ, LZU, LZUD
Knob	46-1961	Volume, All 14" Models except B1410L, LU, LUD, B1410LZ, LZU, LZUD
Knob	46-2077	Volume, Models B1715L, LU, LUD
Knob	53-43493	Volume, All 17" Models except B1715L, LU, LUD
Knob	53-44381	Brightness, Contrast, Vert., Horiz. Hold, 14" Models
Knob	53-44482	Brightness, Contrast, Vert., Horiz. Hold, Models B1715L, LU, LUD
Knob	53-44382	Brightness, Contrast, Vert., Horiz. Hold, All 17" Models except B1715L, LU, LUD

WIRING DATA

High Voltage Lead	Use BELDEN No 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor; 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors; 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8674
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor; 8485 (Round) - 5 Conductor; 8488 (Round) - 8 Conductor

ZENITH CHASSIS 15B20, Q, U, UD

FOLDER 3



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUNER ALIGNMENT INSTRUCTIONS (Con't)

PRE-ALIGNMENT INSTRUCTIONS FOR TUNER #175-113 & 175-114

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a variable bias supply to point (T) . Positive to chassis. Set bias for 2.5 volts.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Matching Trans.	Across antenna terminals thru matching transformer.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K across video detector load.	A201, A202, A203	Adjust A201 and A202 for maximum amplitude and symmetry with markers as shown in Fig. 201. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A203 to obtain MINIMUM response on the scope.
2.	"	"	213MC	211.25MC 215.75MC	13	"	A204	Adjust for maximum amplitude of response similar to Fig. 201. Adjust by expanding or compressing coil turns.
			207MC	205.25MC 209.75MC	12		A205	
			201MC	199.25MC 203.75MC	11		A206	
			195MC	193.25MC 197.75MC	10		A207	
			189MC	187.25MC 191.75MC	9		A208	
			183MC	181.25MC 185.75MC	8		A209	
			177MC	175.25MC 179.75MC	7		A210	
			85MC	83.25MC 87.75MC	6		A211	
			79MC	77.25MC 81.75MC	5		A212	
			69MC	67.25MC 71.75MC	4		A213	
			63MC	61.25MC 65.75MC	3		A214	
			57MC	55.25MC 59.75MC	2		A215	

VHF OSCILLATOR ALIGNMENT

Connect bias as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across video detector load. Low side to chassis.	A216	Adjust to place sound marker in trap notch as in Fig. 202. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A217	
			201MC	199.25MC 203.75MC	11		A218	
			195MC	193.25MC 197.75MC	10		A219	
			189MC	187.25MC 191.75MC	9		A220	
			183MC	181.25MC 185.75MC	8		A221	
			177MC	175.25MC 179.75MC	7		A222	
			85MC	83.25MC 87.75MC	6		A223	
			79MC	77.25MC 81.75MC	5		A224	
			69MC	67.25MC 71.75MC	4		A225	
			63MC	61.25MC 65.75MC	3		A226	
			57MC	55.25MC 59.75MC	2		A227	

UHF IF ALIGNMENT FOR TUNER #175-113

4. Adjust A228 for the most satisfactory picture with MINIMUM noise on any UHF station.

TUNER ALIGNMENT INSTRUCTIONS (Con't)

UHF ALIGNMENT FOR TUNER 175-1

Alignment of the UHF tuner should not be attempted without proper test equipment.
Use only enough generator output to provide a usable indication on VTVM.
Remove the IF (black) cable between the tuners from the UHF tuner socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	Direct	Across UHF antenna terminals.	473.5MC (Unmod)	14	DC probe to point Ⓥ. Low side to chassis.	A229	Adjust for maximum deflection.
6.	"	"	887.5MC	83	"	A230	"

The Oscillator Pick-up Coil (A231) is the short wire inside the oscillator gang section to which the crystal is connected. Injection is changed by moving it in or out of the oscillator section.
Connect the negative lead of a 0-50 microammeter through 5600Ω to point Ⓥ. Positive side to chassis.
Set tuning gang at mid-range.
Remove B+ from UHF Oscillator at point Ⓦ and note meter reading. Apply B+ and note reading. Difference between the two reading should be between 10 and 40 microamps for proper injection.

UHF ALIGNMENT TUNER #175-5

Alignment of the UHF tuner should not be attempted without the proper test equipment.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Fig. 203	High side thru matching network (Fig. 203) to UHF antenna terminals.	713MC (10MC Swp)	711.25MC	54	Vert. Amp. thru 10K to video detector load. Low side to chassis.	A231, A232, A233	With the UHF tuning knob set to channel 54, the rocker arm on the tuner should be in the horizontal position. If necessary, loosen set screw and turn the shaft independently of the pulley until the arm is in the horizontal position with the channel indication on channel 54. Tighten the set screw. If the calibration is off more than 3 channels, adjust A231 to place video marker at 50% on curve as in Fig. 204. The image (weaker response) will appear also. The response toward counterclockwise position of A231 is the proper response. Adjust A232 and A233 for maximum amplitude of response similar to Fig. 204.
6.	"	"	473MC (10MC Swp)	471.25MC	14	"		Check for response similar to Fig. 204. If the oscillator is off more than 3 channels, adjust oscillator travel adjustment (osc., mixer and antenna travel adjustments are the three hex nuts on top of the UHF tuner next to the tuner chassis) to scale. Care must be used when making the adjustment so as not to move the rocker arm out of its bearing. Set the mixer and antenna travel adjustments for maximum response on scope.
7.	"	"	887MC (10MC Swp)	885.25MC	83	"	A234, A235, A236	Adjust A234 to place marker at 50% on curve similar to Fig. 204. Adjust A235 and A236 for maximum amplitude and symmetry.

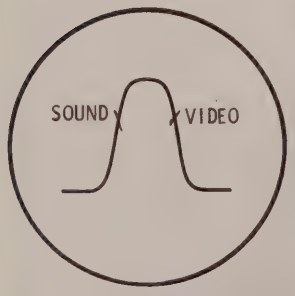


FIG. 201

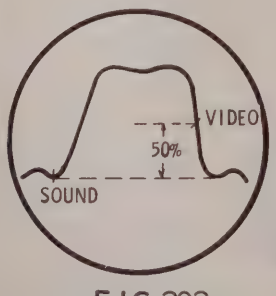


FIG. 202

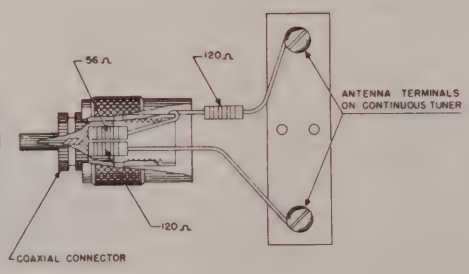


FIG. 203

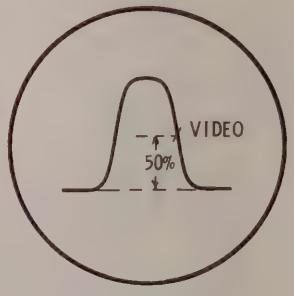


FIG. 204

TUNER 175-112 PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BK7B	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6U8A	6EA8 *

* Alternate.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	12		22-2679						2.5%
C202	18	1000	22-2680						5%
C203	18	1000	22-2680						5%
C204	12		22-2679						2.5%
C205	3.3		22-2343						2.5%
C206	8.2		22-2681						NPO 5%
C207	1000		22-2889	EF-001	MFT-1000			503C-D1	
C208	1.8		22-2428						
C209	1000		22-2889	EF-001	MFT-1000			503C-D1	
C210	1000		22-2889	EF-001	MFT-1000			503C-D1	
C211	25		22-2671	N750-DI 25	DTN-25	C10Q25U	TC7-25	5TCU-Q25	N750 10%
C212	1		22-2720	NPO-SI 1	TCZ-1		TCO-1	5TCCB-V1	
C213	1000		22-2889	EF-001	MFT-1000			503C-D1	
C214	1		22-2714						N1500 ±.1mmf
C215									
C216	5		22-2716						N330 5%
C217	5		22-2716						N330 5%
C218	800		22-2331						
C219	1000		22-2889	EF-001	MFT-1000			503C-D1	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ZENITH PART No.	NOTES
	OHMS	WATT		
R201	230K			
R202	230K			
R203	2.2meg			
R204	22K			
R205	120K			
R206	100K			

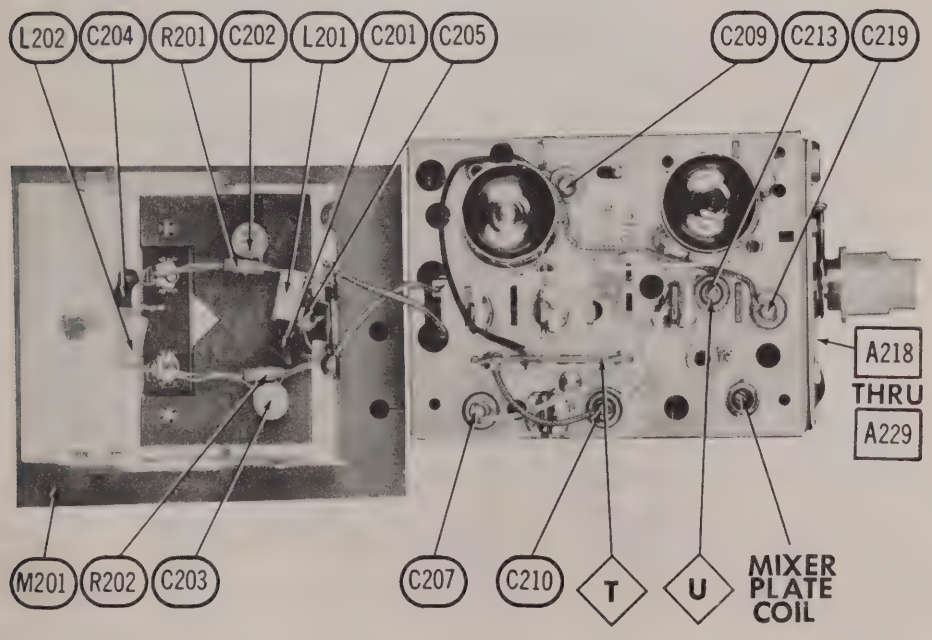
ITEM No.	RATING		ZENITH PART No.	NOTES
	OHMS	WATT		
R207	100K			
R208	100K			Note 1
R209	10K	2	63-3176	
R210	4700Ω			
R211	10K			
R212	1200Ω			

Note 1. Some versions may use 68K in this application.

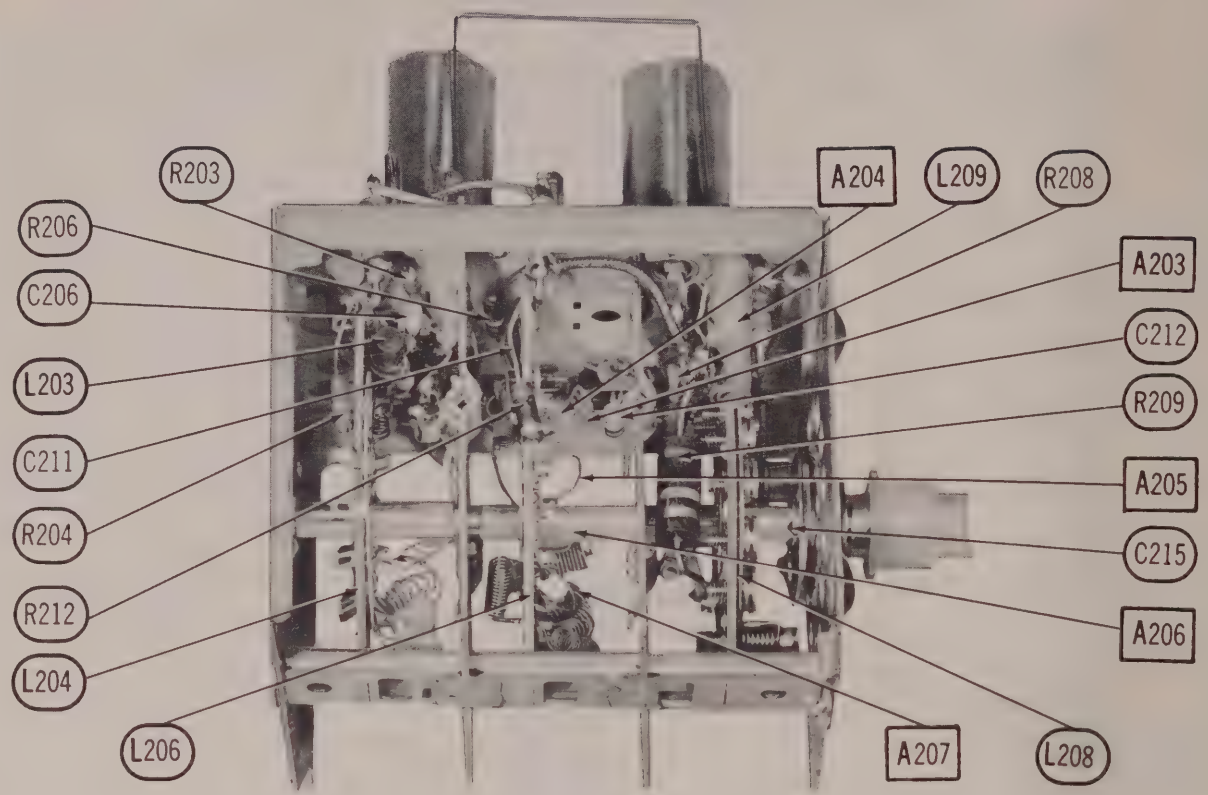
COILS (RF-IF)

ITEM No.	USE	ZENITH PART No.	NOTES
L201	IF Trap Coil	20-567	
L202	IF Trap Coil	20-567	
L203	Ant. Trans.	S-24644	
	Ant. Trans.	S-24645	Alternate
L204	Ant. Coils	S-23641	Channel 2-13, Complete wafer Assy.
L205	Neut. Coil	20-633	

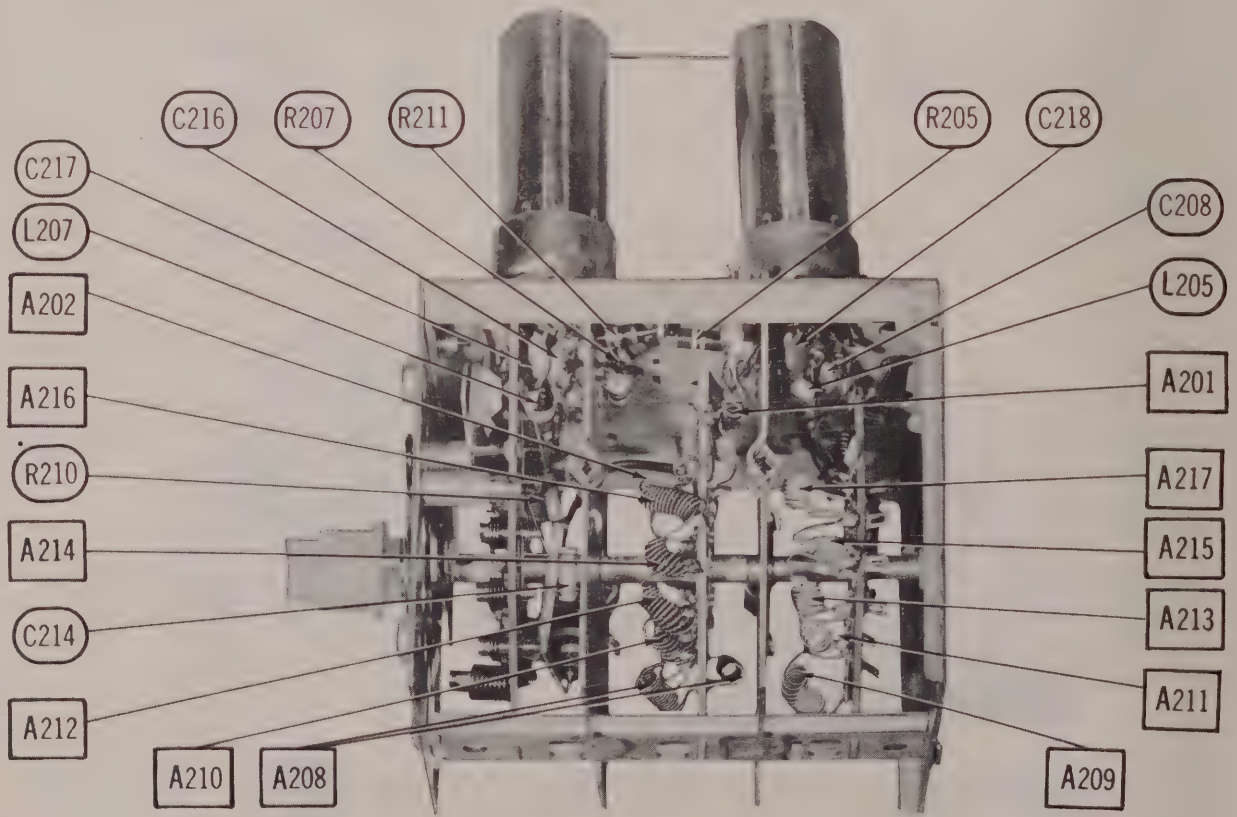
ITEM No.	USE	ZENITH PART No.	NOTES
L206	RF Coils	S-23640	Channel 2-13, Complete wafer Assy.
L207	RF Choke	20-632	
L208	Osc. Coils	S-41807	Channel 2-13, Complete wafer Assy.
L209	Mixer Plate Coil	S-42840	



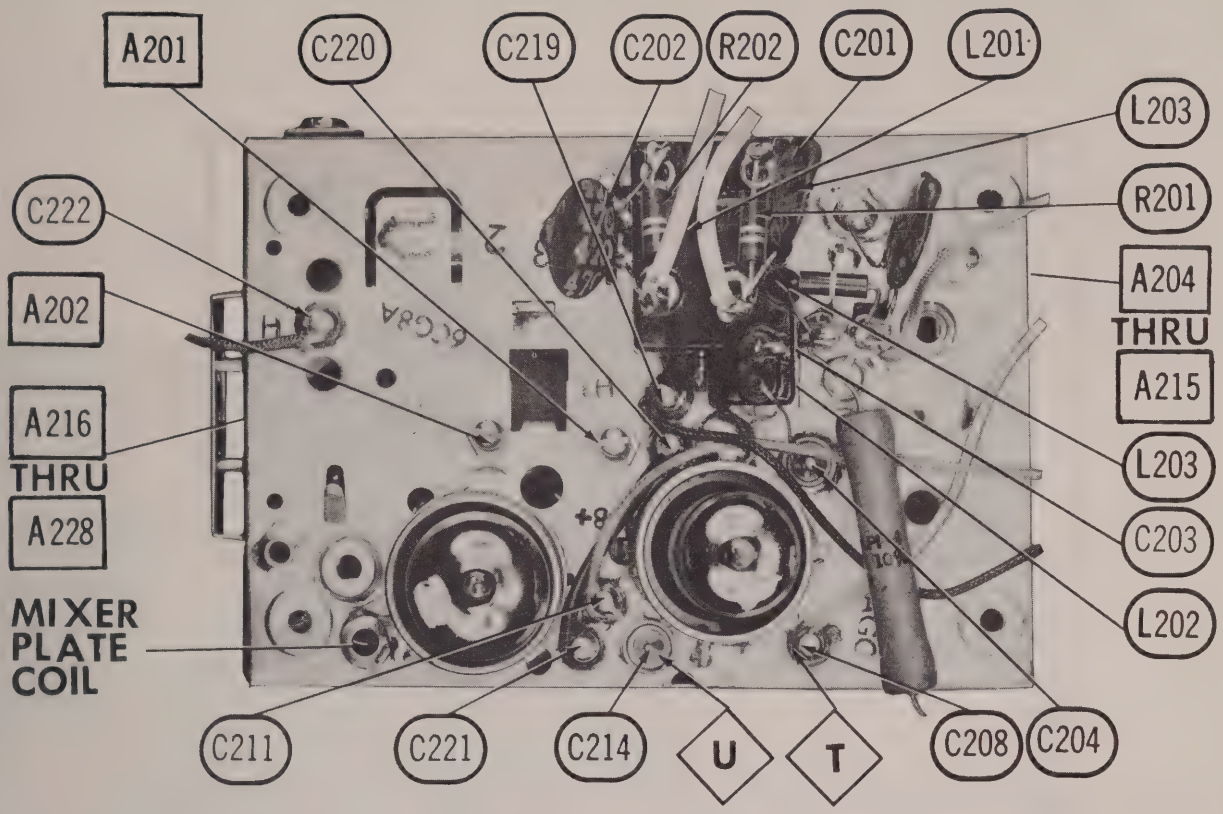
TUNER 175-112 TOP VIEW



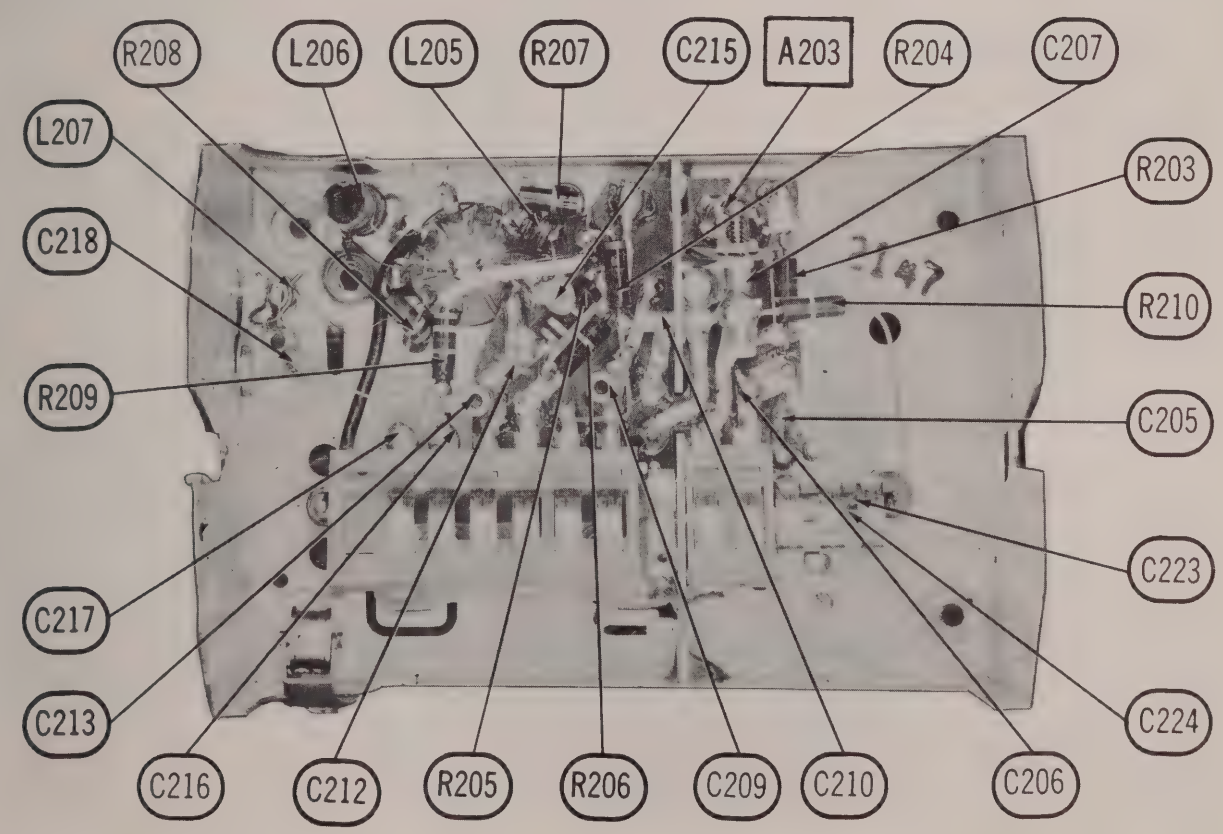
TUNER 175-112 - LEFT SIDE



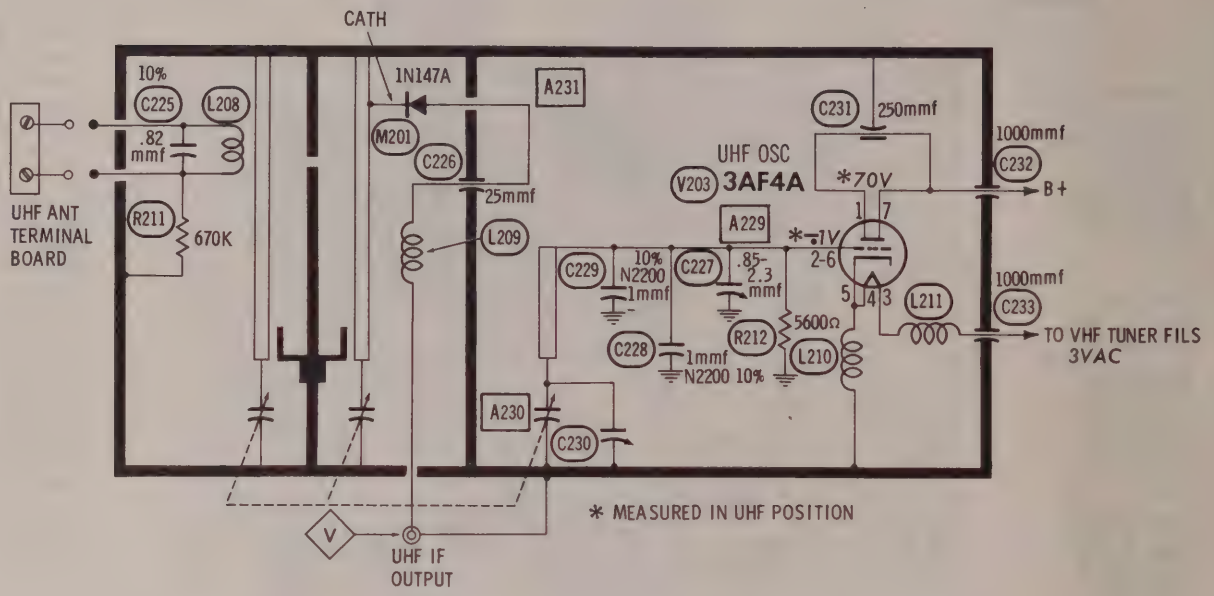
TUNER 175-112 - RIGHT SIDE



TUNER 175-113 - TOP VIEW



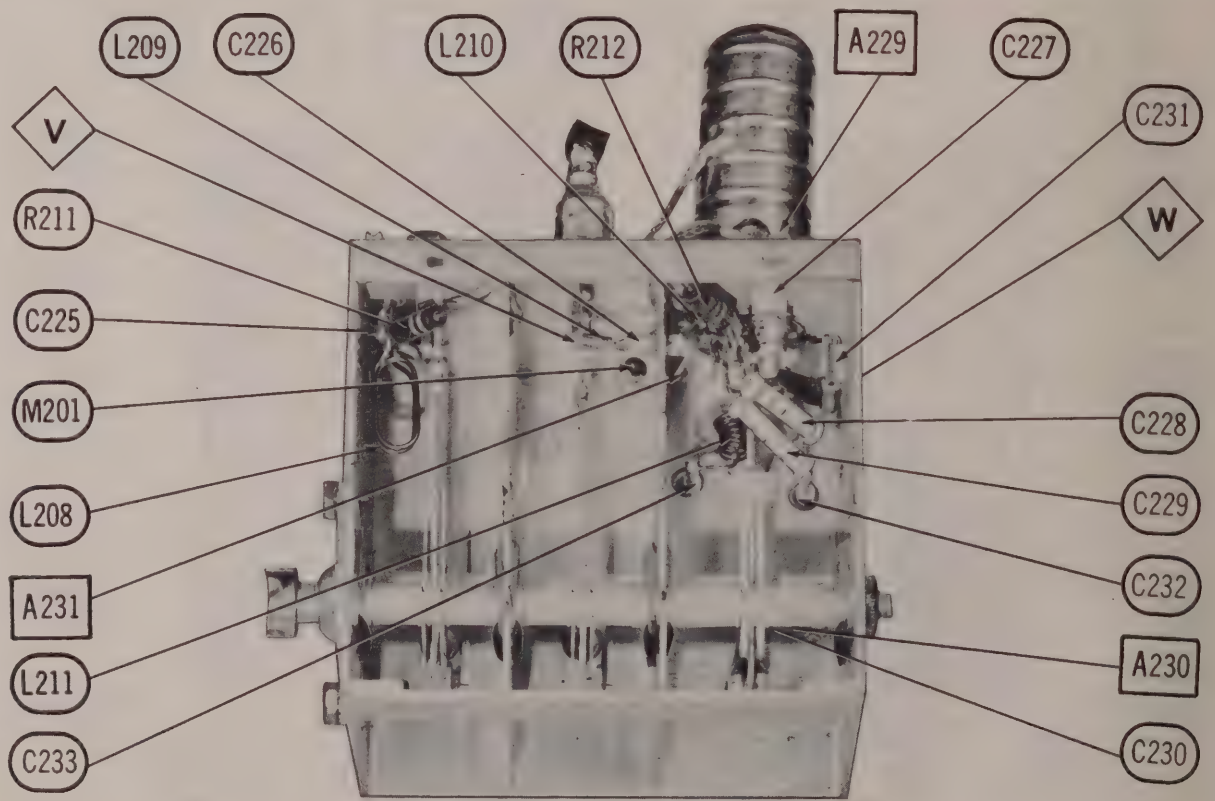
TUNER 175-113 - BOTTOM VIEW



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

UHF TUNER 175-1

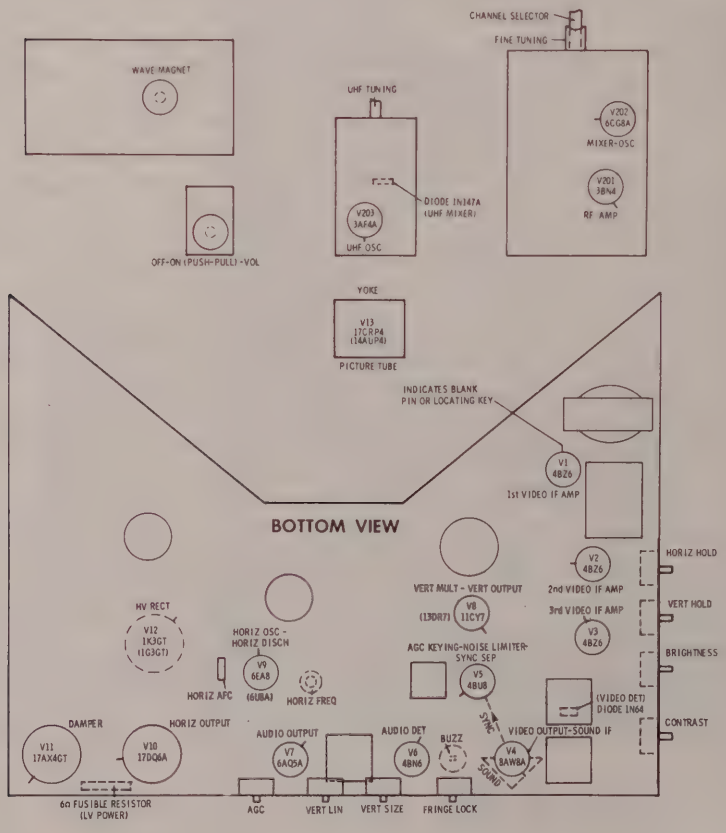


UHF TUNER 175-1

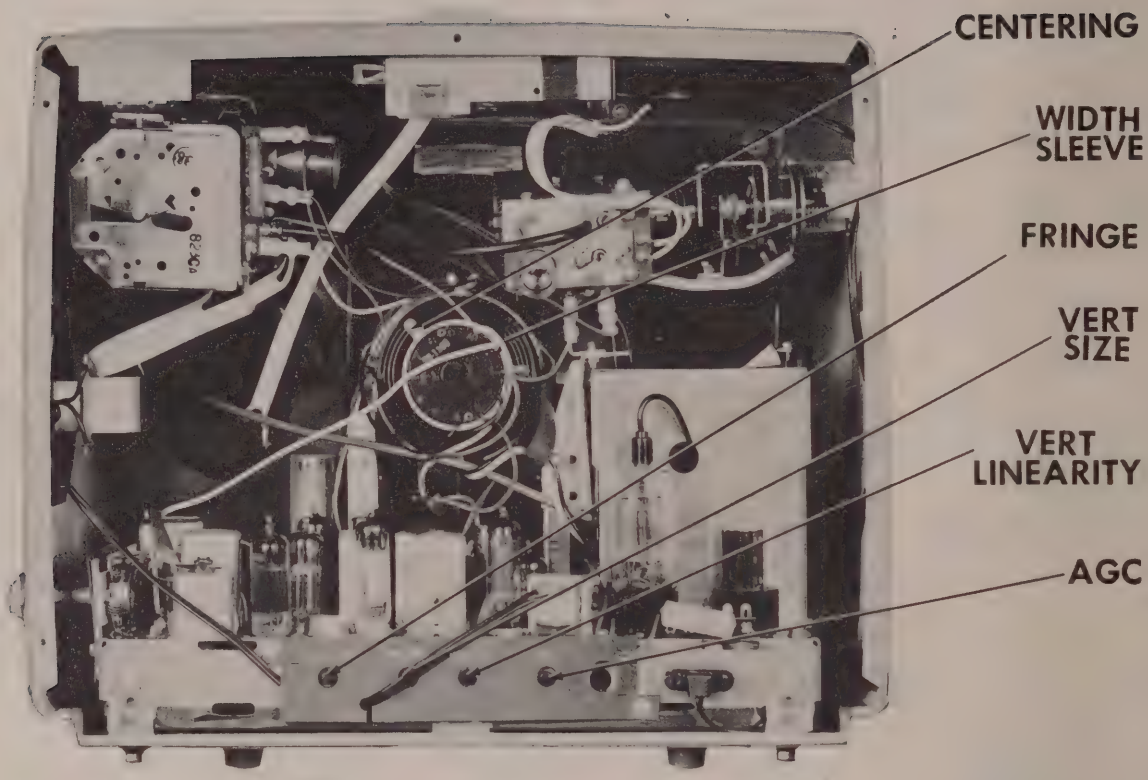
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	4BZ6	1.2meg	1500Ω	6Ω	5Ω	†† 247Ω	†† 247Ω	1500Ω		
V2	4BZ6	60K	†† 27Ω	6Ω	7Ω	† 220Ω	† 220Ω	INF		
V3	4BZ6	.1Ω	120Ω	7Ω	8Ω	† 4700Ω	† 4700Ω	0Ω		
V4	8AW8A	0Ω	100K	† 32K	10Ω	8Ω	47Ω	4000Ω	† 33K	† 8000Ω
V5	4BU8	0Ω	† 12K	† 720K	13Ω	14Ω	† 800K	† 1.5meg	† 30K	† 6.8meg
V6	4BN6	• 200Ω	.5Ω	10Ω	11Ω	† 22K	4.8Ω	† 390K		
V7	6AQ5A	0Ω	680Ω	13Ω	11Ω	† 1600Ω	† 1000Ω	0Ω		
V8	11CY7	† 460Ω	TP	2.2meg	17Ω	14Ω	• ǂ6meg	• 380K	0Ω	• 1500Ω
V9	6EA8	• † 100K	100K	† 47K	17Ω	18.5Ω	ǂ120K	25Ω	0Ω	1meg
V10	17DQ6A	NC	48Ω	NC	† 15K	680K	TP	52Ω	0Ω	TOP CAP ǂ11.5Ω
V11	17AX4GT	NC	NC	INF	NC	† 0Ω	NC	18.5Ω	21Ω	
V12	1K3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP ǂ251.5Ω
V13	17CRP4	3.5Ω	22K	Pin 6 † 60K	Pin 10 † 60K	Pin 11 • 230K	Pin 12 5Ω			
V201	3BN4	0Ω	3meg	3.5Ω	2.5Ω	† 5700Ω	0Ω	3meg		
V202	6CG8A	3900Ω	† 8500Ω	0Ω	1Ω	2.5Ω	† 4700Ω	† 15K	0Ω	220K
V203	3AF4A	*† 11K	5600Ω	1Ω	.1Ω	.1Ω	5600Ω	† *11K		
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

- • THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
- † MEASURED FROM 260V SOURCE.
- †† MEASURED FROM PIN 7 OF V2.
- ǂ MEASURED FROM PIN 3 OF V11.
- NC NO CONNECTION.
- TP TIE POINT.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

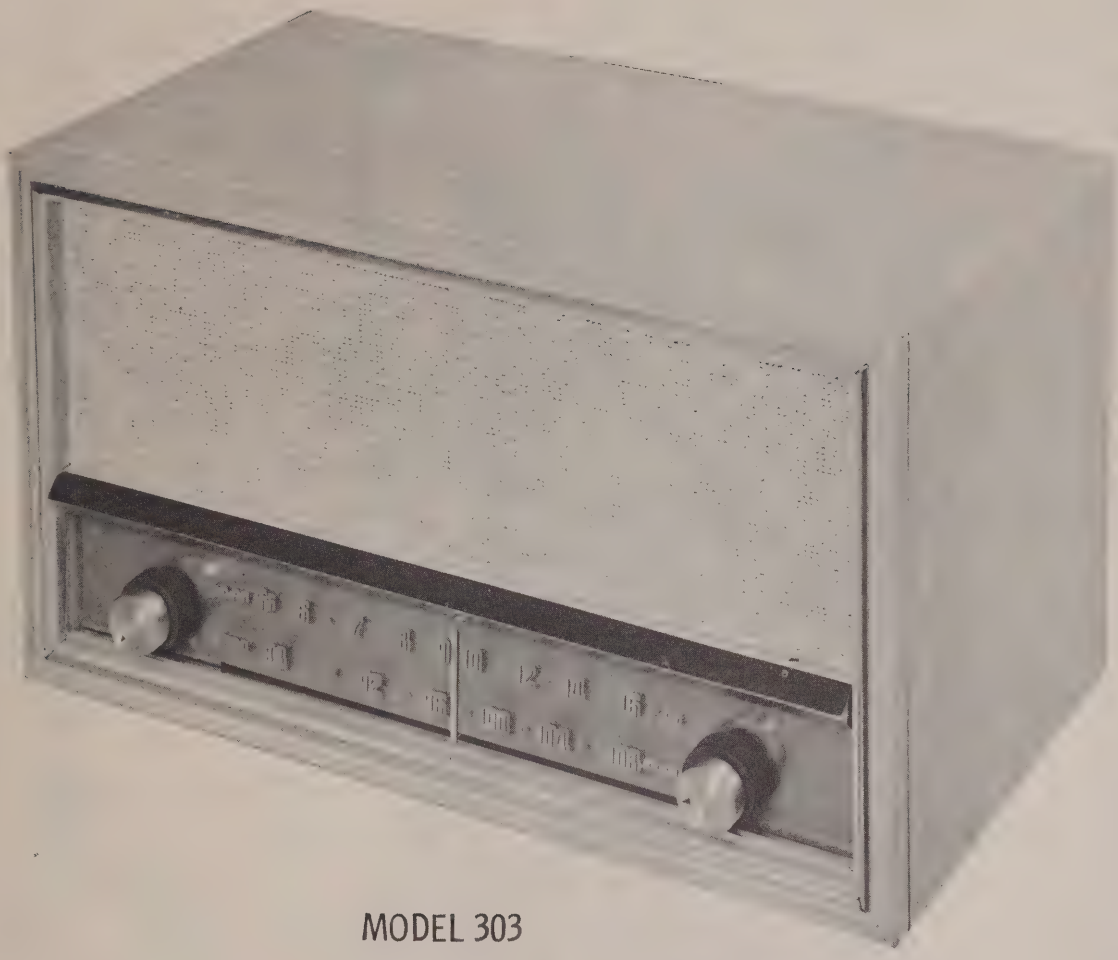
Set the Horizontal Hold to the center of its range.

Tune in a TV station and adjust the Horizontal Frequency slug (B1) until the picture synchronizes horizontally.

Proper adjustment is indicated when it is possible to switch from one channel to another without the picture losing sync.

PHOTOFACT* Folder

ADMIRAL MODELS
303, 304 (Ch. 6B3)



MODEL 303

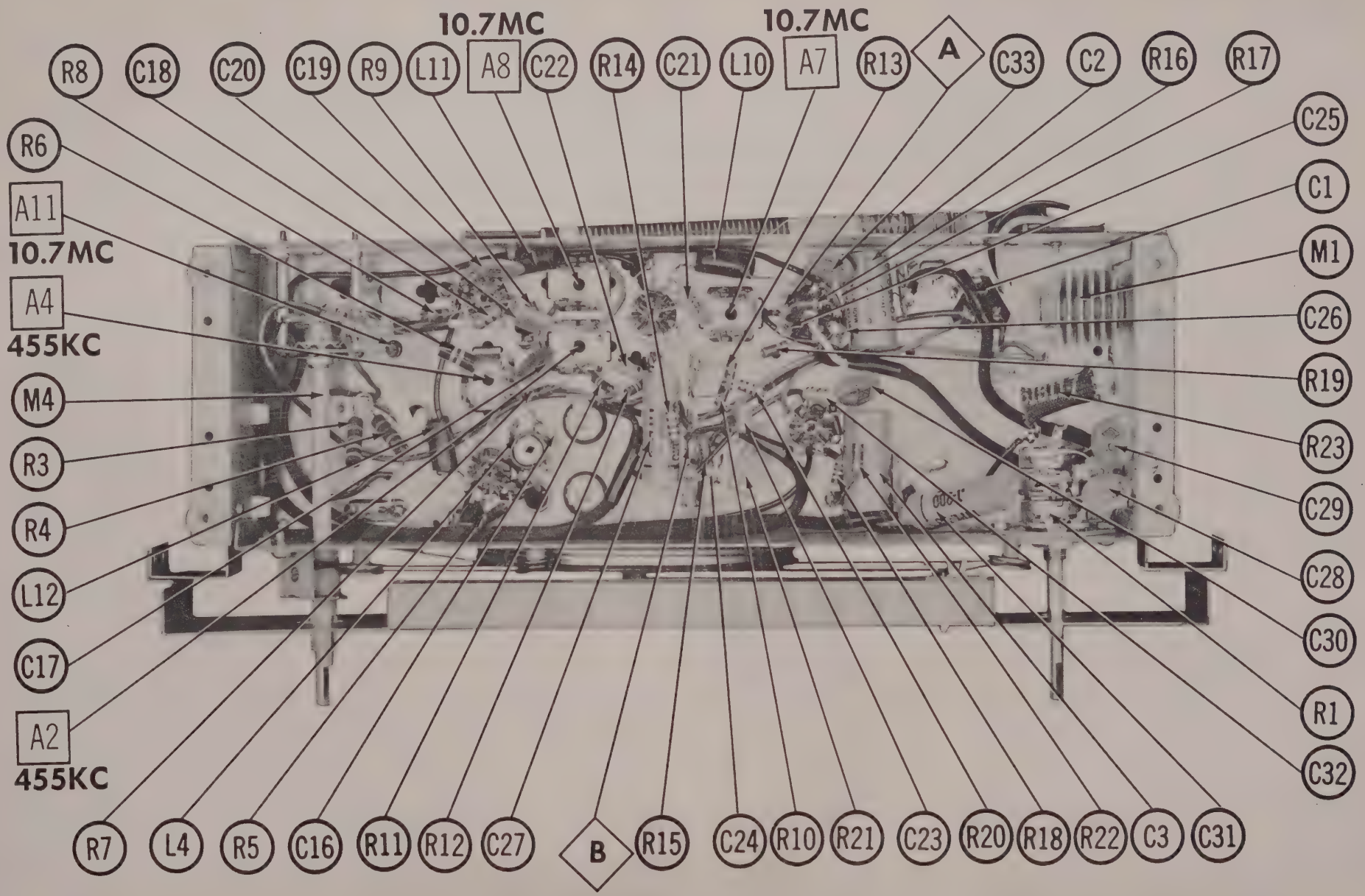
ADMIRAL MODELS
303, 304 (Ch. 6B3)

TRADE NAME	Admiral Models 303, 304 (Ch. 6B3)		
MANUFACTURER	Admiral Corp., 3800 W. Cortland Street, Chicago 47, Illinois		
TYPE SET	AC-DC Operated FM-AM Receiver		
TUBES (Six)	Types 12DT8 FM RF Amp.-FM Conv., 12AU6 AM Converter, 12BA6 1st FM-AM IF Amplifier, 12AU6 2nd FM IF Amp.-AM Det.-AVC, 19T8 Ratio Det.-AF Amp., 50C5 Output		
POWER SUPPLY	110-120 Volts AC-DC	RATING	.32 Amp. @ 117 Volts AC (29 Watts) FM
TUNING RANGE - BROADCAST	535 - 1620KC	FREQ. MOD.	88 - 108MC

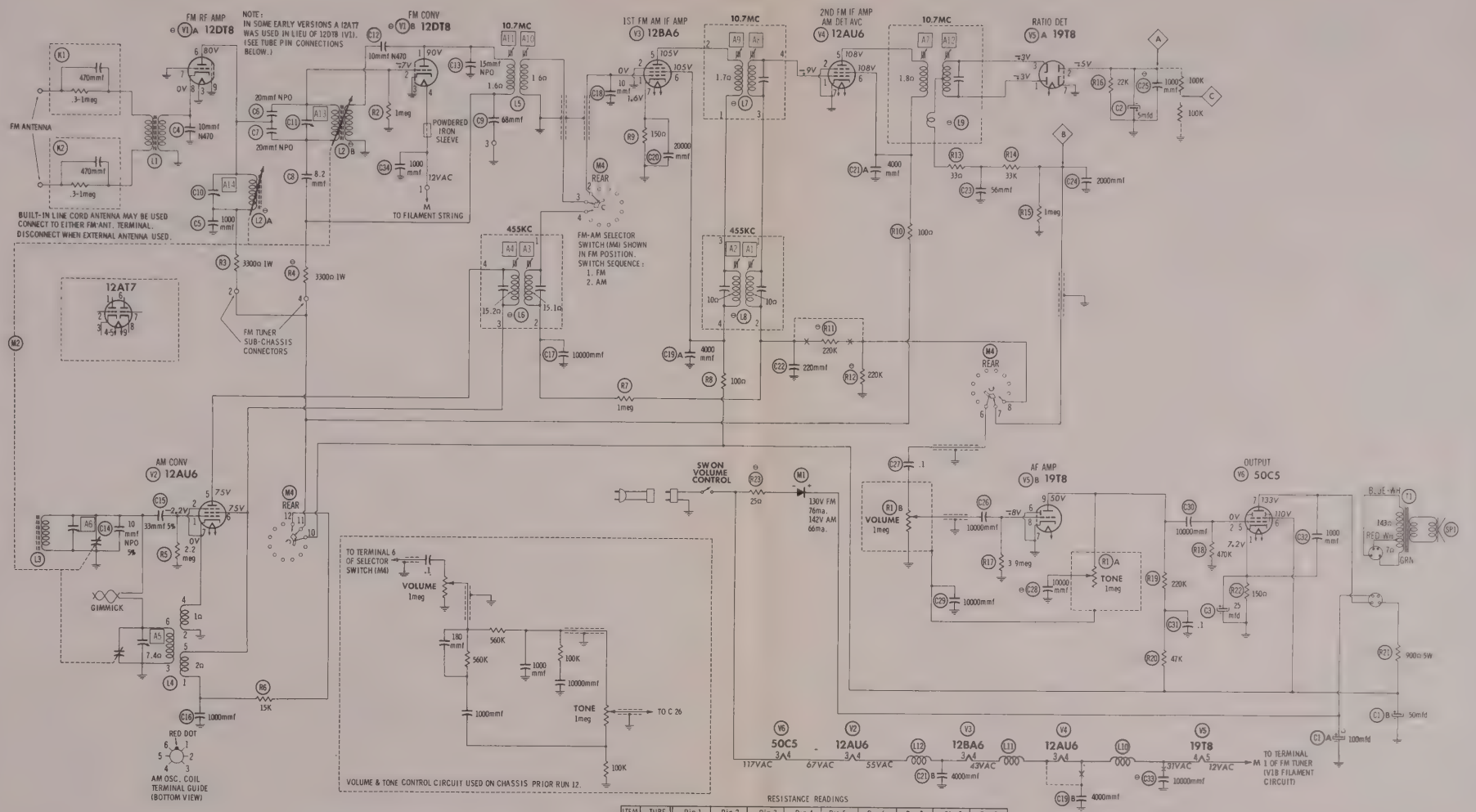
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H725



CHASSIS-BOTTOM VIEW


FM RF AMP V1A 12DT8
FM CONV V1B 12DT8
1ST FM AM IF AMP V3 12BA6
2ND FM IF AMP AM DET AVC V4 12AU6
RATIO DET V5A 19T8
AM CONV V2 12AU6
AF AMP V5B 19T8
OUTPUT V6 50C5
12AT7
NOTE: IN SOME EARLY VERSIONS A 12AT7 WAS USED IN LIEU OF 12DT8 (V1). (SEE TUBE PIN CONNECTIONS BELOW.)
FM ANTENNA
BUILT-IN LINE CORD ANTENNA MAY BE USED CONNECT TO EITHER FM ANT. TERMINAL. DISCONNECT WHEN EXTERNAL ANTENNA USED.
FM TUNER SUB-CHASSIS CONNECTORS
POWDERED IRON SLEVE
TO FILAMENT STRING
455KC
FM-AM SELECTOR SWITCH (M4) SHOWN IN FM POSITION. SWITCH SEQUENCE: 1. FM 2. AM
SW ON VOLUME CONTROL
VOLUME 1meg
TONE 1meg
GIMMICK
RED DOT
AM OSC. COIL TERMINAL GUIDE (BOTTOM VIEW)
TO TERMINAL 6 OF SELECTOR SWITCH (M4)
TO C 26
VOLUME & TONE CONTROL CIRCUIT USED ON CHASSIS PRIOR RUN 12.
130V FM 76ma. 142V AM 66ma.
117VAC
67VAC
55VAC
43VAC
31VAC
12VAC
TO TERMINAL M 1 OF FM TUNER (V1B FILAMENT CIRCUIT)

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12DT8	†4200Ω	1meg	0Ω	12Ω	0Ω	†4200Ω	0Ω	.1Ω	0Ω
V2	12AU6	2.2meg	1Ω	67Ω	55Ω	†⏏16K	†⏏16K	1Ω		
V3	12BA6	1.6Ω ⏏1.4meg	0Ω	55Ω	43Ω	†1000Ω	†1000Ω	150Ω		
V4	12AU6	440K	0Ω	43Ω	31Ω	†1000Ω	†1000Ω	0Ω		
V5	19T8	1meg	22K	1meg	31Ω	12Ω	0Ω	0Ω	3.9meg	†265K
V6	50C5	150Ω	470K	115Ω	67Ω	470K	†900Ω	†143Ω		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED
† MEASURED FROM OUTPUT OF M1.
⏏ MEASURED IN "AM" POSITION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

426-4

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting. Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to antenna stator lug of tuning gang. Low side to B-.	455KC (400∿ Mod.)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1620KC	"	"	"	A5	"
3.	"	Loop	1400KC	"	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100K (±1%) resistors in series from point Ⓐ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.1mfd	Across FM antenna terminals	10.7MC (Unmod.)	FM	Point of non-interference	DC probe to point Ⓐ. Common to B-.	A7, A8, A9, A10, A11	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.1mfd	Across FM antenna terminals	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point Ⓐ. Low side to B-.	A7, A8, A9, A10, A11	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5.	"	"	"	"	"	Vert. Amp. to point Ⓑ. Low side to B-.	A12	Reconnect stabilizing capacitor C2. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	Two 150Ω Carbon Resistors	To FM antenna terminals with 150Ω in each lead.	109MC (Unmod.)	FM	Tuning gang fully open	DC probe to point Ⓐ. Low side to B-.	A13	Loosen screw on tuning shaft. Loosen tuning string. Adjust A13 for maximum. Tighten slack in string and tighten screw.
7.	"	"	96MC	"	Tune to 96MC signal	"	A14	Adjust for maximum output while rocking tuning gang.
	Check calibration of receiver at 108.4MC. If necessary, loosen screw on tuning shaft and adjust string tension. Tighten screw. Repeat step 7.							

FIG. 1

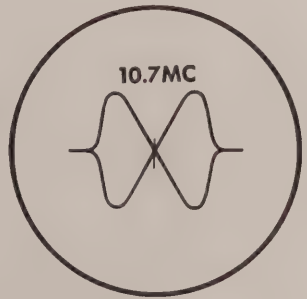
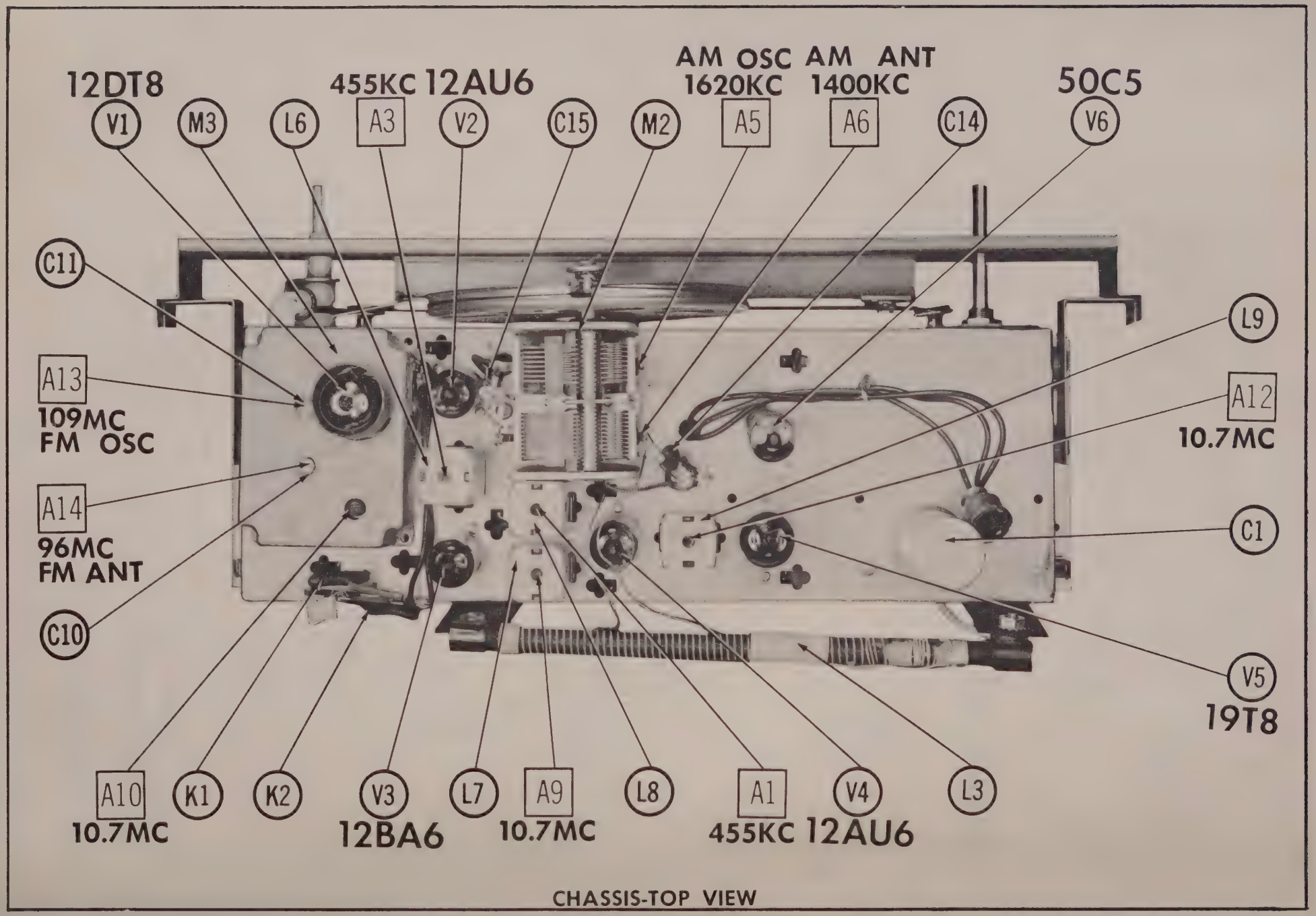


FIG. 2



CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amp.-FM Conv.	12DT8	Note 1
V2	AM Converter	12AU6	
V3	1st FM-AM IF Amp.	12BA6	
V4	2nd FM IF Amp. - AM Det. - AVC	12AU6	
V5	Ratio Det.-AF Amp.	19T8	
V6	Output	50C5	

Note 1. Early versions use 12AT7

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ADMIRAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■100	150	67D7-35	AFH3-11-50	XC0105	FP311.65	TMT-10	T-050	R2706 *
B	▲50	150							
C2	5	50	67A4-37	PRS50V5	BBR5-50	TT50X5	TD-5-50	MT-0504	TVA-1303
C3	25	15	67A4-30	PRS25V25	BBR25-25	TC26	TD-25-25	MT-0225	TVA-1205

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	10		53C2-52						N470
C5	1000		53C2-53	SI 1000	D6-102	LT6D1	UC-521	5GA-D1	
C6	20		53C2-56						NPO
C7	20		53C2-56						NPO
C8	8.2		53C2-59						
C9	68		53C2-60						
C10			53C2-55						
C11			53C2-58						
C12	10		53C2-52						N470
C13	15		53C2-61						NPO
C14	10		65D6-118						NPO 5%
C15	33		65D10-119						5%
C16	1000		65D10-53	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C17	10000		65D10-3	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C18	10		65D6-44	SI 10	D6-100	LT6Q1	UC-541	5GA-Q1	
C19A	4000		65A17-1	BPD-2X004	DD-402	BYC6DD4	DCD524	5HK-2D4	
B	4000				DD-402				
C20	20000		65D10-28	BPD-02	DD-203	BYB6S2		5HK-S2	
C21A	4000		65A17-1	BPD-2X004	DD-402	BYC6DD4	DCD524	5HK-2D4	
B	4000				DD-402				
C22	220		65D6-80	SI 220	D6-221	LT6T22	UC-5322	5GA-T22	
C23	56		65D6-34	SI 56	D6-560	LT6Q56	UC-5456	5GA-Q56	
C24	2000		65D10-7	BPD-002	DD-202	BYA10D2	DC522	5HK-D2	
C25	1000		65D10-53	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	①
C26	10000		65D10-3	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C27	.1	200	64B1-30	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	②
C28	10000		65D10-41	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C29	10000		65D10-3	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C30	10000		65D10-3	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C31	.1	200	64B1-30	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C32	1000		65D6-92	SI 1000	D6-102	LT6D1	UC-521	5GA-D1	
C33	10000		65D10-3	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	②
C34	1000		53C2-53	SI 1000	D6-102	LT6D1	UC-521	5GA-D1	

① Some versions 2000mmf in this application (Part #65D10-7).
② Not used prior to Run 12.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	75B11-33 ①	F1-52			■ UE3852-S	Tone
B	1meg	½		R2-51				Volume
C	Switch			KB-1 or KR-1*				Power On-Off

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.
■ "STA-LOC" Equivalent: FA16A, OS1437A, RU16L, IS2312, US4L
① Part #75B11-34 may be used in some versions.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ADMIRAL PART No.	NOTES
R2	1meg		53C2-51	
R3	3300Ω	1	60B14-332	
R4	3300Ω	1	60B14-332	①
R5	2.2meg		60B8-225	
R6	15K		60B8-153	
R7	1meg		60B8-105	
R8	100Ω		60B8-101	
R9	150Ω		60B8-151	
R10	100Ω		60B8-101	
R11	220K		60B8-224	②
R12	220K		60B8-224	③
R13	33Ω		60B8-330	
R14	33K		60B8-333	
R15	1meg		60B8-105	
R16	22K		60B8-223	
R17	3.9meg		60B8-395	
R18	470K		60B8-474	
R19	220K		60B8-224	
R20	47K		60B8-473	
R21	900Ω	5(WW)	61B24-14	
R22	150Ω		60B8-151	
R23	25Ω		61A11-7	Fuse Type ④

① Early versions use 10K
② Early versions use 470K
③ Not used in early versions
④ Early versions use 50Ω

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA ADMIRAL PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Ant. Trans.	53C2-63					
L2A	FM RF Coil	53C2-66					Note 1
B	FM Osc. Coil						* Disregard Primary
L3	Loopstick	69B229-1	14-9003 *				
L4	AM Osc. Coil	69A227					
L5	1st FM IF	53C2-64					
L6	1st AM IF	72C28-70	16-6758	BC-352	12-C1	RF-1	Note 2
L7	2nd FM IF	72C28-68	16-6758	BC-353	12-C2	RF-2	Note 2
L8	2nd AM IF	72C28-71	16-3487	FM-254	1463		Note 2
L9	Ratio Det. Trans.	72C196-1					Note 3
L10	Fil. Choke	73A2-8					
L11	Fil. Choke	73A2-13					
L12	Fil. Choke	73A2-13					

Note 1. Tuning Core Part #53C2-67.
Note 2. Some versions may use Part No. with letter "D".
Note 3. Some versions may use Part No. with letter "B".

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2300Ω Tap③ 250Ω	3-4Ω	79C45-4	Z1103	A-3031		A-3336	24S50A	S-16X	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA ADMIRAL PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	4" x 6"	PM	3-4Ω	78B141-2	46A15 ①	① Drill holes in pot for output transformer.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ADMIRAL PART No.	REPLACEMENT DATA
K1	Antenna Isolation	470mmf, 300K-1meg	63B10-1	Centralab RC-471 Sprague AC1-1
K2	Antenna Isolation	470mmf, 300K-1meg	63B10-1	Centralab RC-471 Sprague AC1-1

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA ADMIRAL PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.076A	93B1-10	1235AH	T100 SD-92 ①	100A K200 ①	① Silicon Type

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M2	Tuning Cap.	68C69	2 Gang, Ant. 22-385mmf, Osc. 17-125mmf
M3	FM Tuner	53C2	Complete
M4	Switch	77B76-2	AM-FM, Rotary, Wafer Type

CABINETS & CABINET PARTS

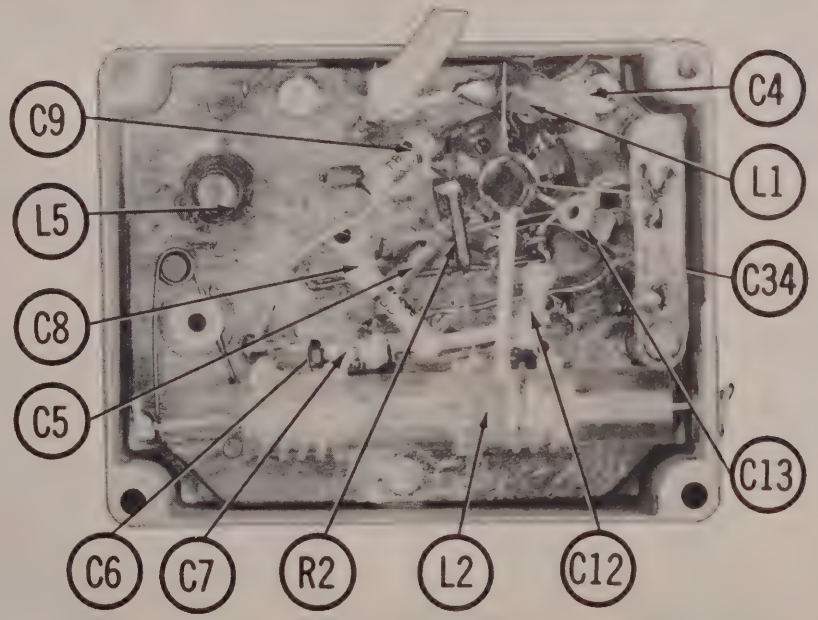
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	33C254-4	Tuning
Knob	33C254-1	On-Off-Volume
Knob	33C254-3	Tone
Knob	33C254-2	Selector
Cabinet	35E410-3	Model 303
Cabinet	35E410-4	Model 304
Dial Pointer	25A62	
Dial Scale	21C101	

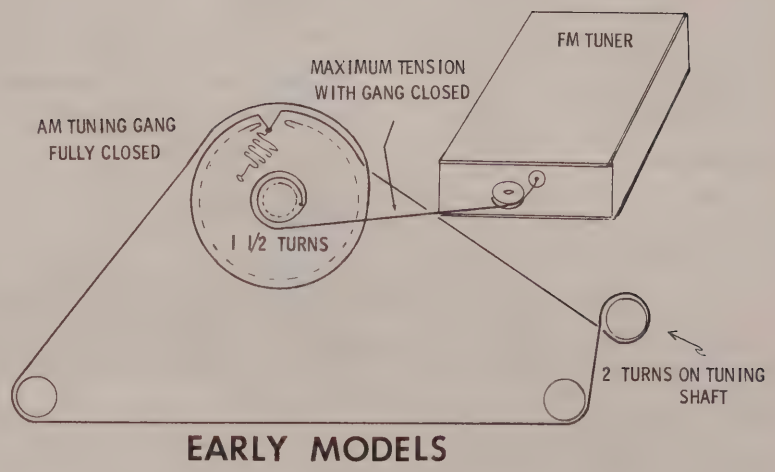
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

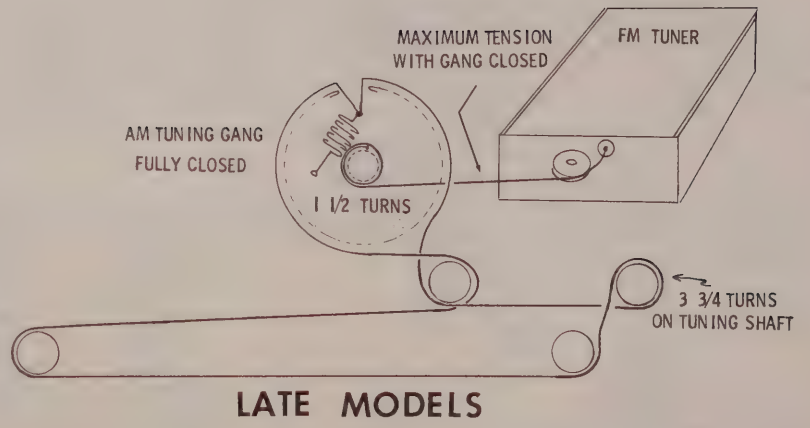
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



FM RF SUB CHASSIS



EARLY MODELS



LATE MODELS

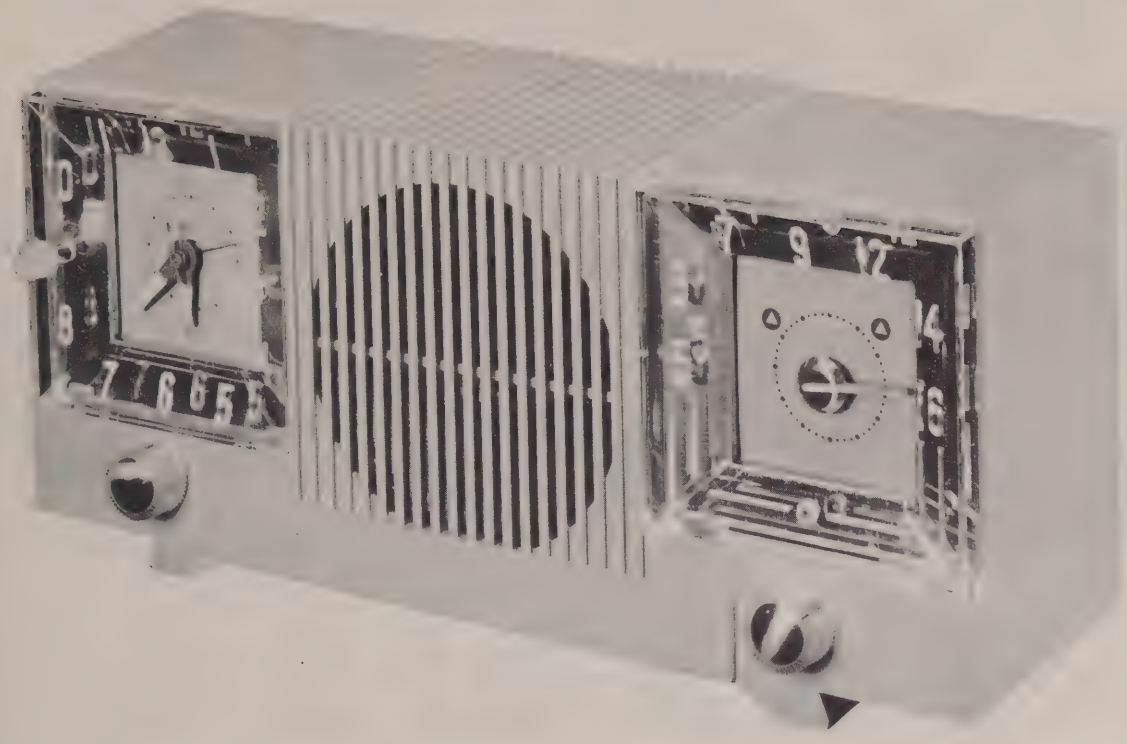
DIAL CORD STRINGING

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

AUTOMATIC
MODEL CL-100

AUTOMATIC
MODEL CL-100



AUTOMATIC
MODEL CL-100

TRADE NAME	Automatic Model CL-100
MANUFACTURER	Automatic Radio Mfg. Co., Inc., 122 Brookline Ave., Boston, Mass.
TYPE SET	AC Operated AM Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 (or) 12AT6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles
RATING	.29 Amp. @ 117 Volts AC (28 Watts) Less Clock
TUNING RANGE—BROADCAST	535 - 1620KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H748

SET 426 FOLDER 5

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amp.	12AV6	Note 1
V4	Output	50C5	
V5	Rectifier	35W4	

Note 1. Alternate Type 12AT6.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	AUTOMATIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	CE-601U	PRS150V5050	BBRD5515	TCD49	TDLD-9	MTD-1550	TVA-2453
B	50	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	AUTOMATIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	1500			SI 1500	D6-152	LT6D15	UC-5215	5GA-D15	①
C3	51				TCZ-51	C10Q51C			NPO ②
C4	.047	400	C473-4PC	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C5	.01	600	C103-6PC	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	
C6	.047	400	C1473-4	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C7	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	③

① Not used in some versions.
② Some versions may use 100mmf in this application (Part #CC101).
③ In some versions C7 may be in series with a coil (Assembly Part #C14L-PC).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AUTOMATIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	400K	½	RV-34-U	B-60	A47-500K-Z	Q13-133	U48	Volume Note 1
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

Note 1. Alternate Part #RV-152A (750K).

RESISTORS

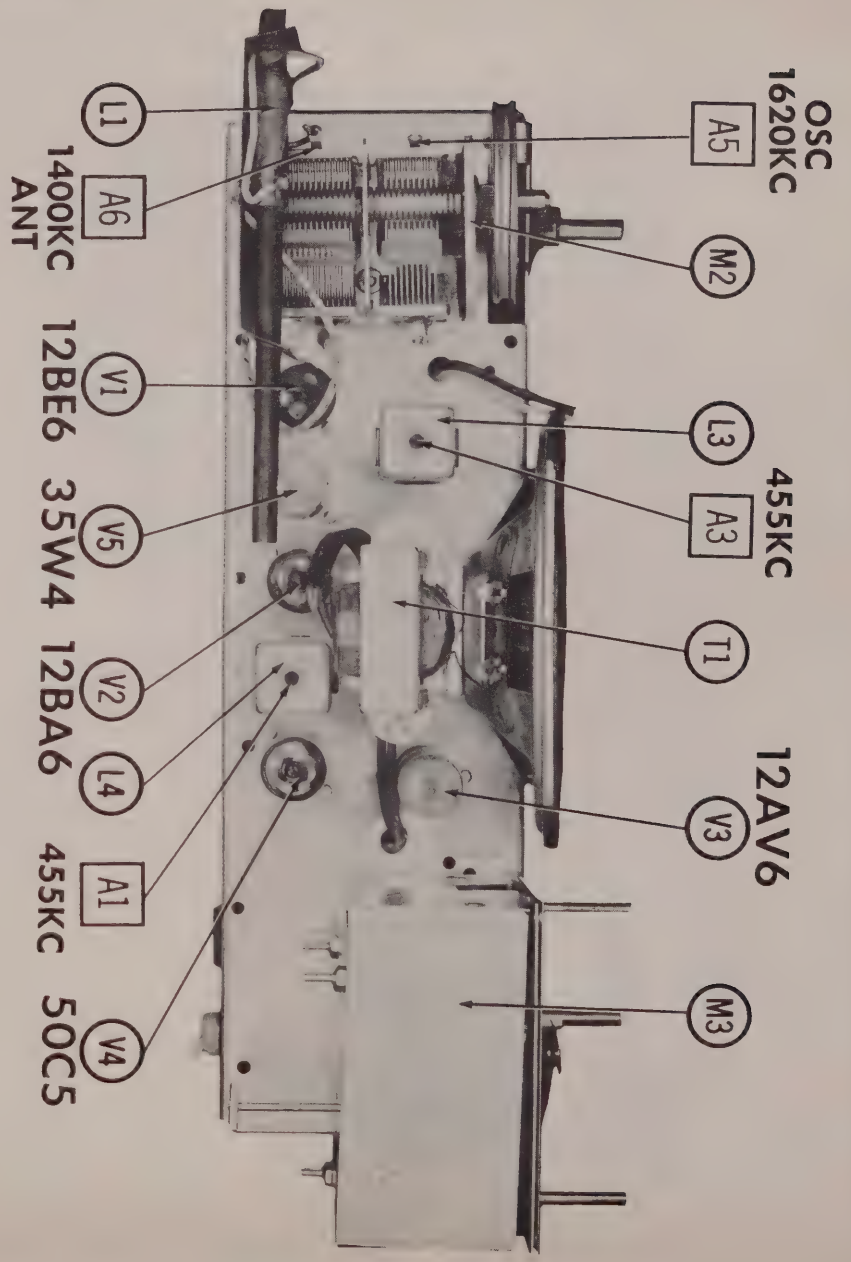
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		AUTOMATIC PART No.	NOTES
	OHMS	WATT		
R2	470K		R474	①
R3	22K		R223	
R4	330Ω		R331	①
R5	82Ω		R820	
R6	2.2meg		R225	

ITEM No.	RATING		AUTOMATIC PART No.	NOTES
	OHMS	WATT		
R7	150Ω		R151	
R8	1500Ω	1	R152-1	
R9	33Ω		R330	
R10	270K		R274	②

① Not used in some versions.
② Some versions use 250K in this application (Part #R254).

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		AUTOMATIC PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	L-A64					
L2	Osc. Coil	L204	14-1074	BC-394			
L3	Input IF	1655-16PC	16-6758	BC-352	12-C1	RF-1	
L4	Output IF	1655-PC	16-6758	BC-353	12-C2	RF-2	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	AUTOMATIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2800Ω	3-4Ω	Part of SP1	Z1105	A-2928	AU-603	A-3876	22S46	S-1X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	AUTOMATIC PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	PM-260/265①	5A1	① Includes T1.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	AUTOMATIC PART No.	REPLACEMENT DATA	
K1	Audio Coupling Net.	5000mmf, 220mmf, 5000mmf, 250mmf, 470K, 470K, 6.8meg	PC-151	Aerovox Centralab Cornell-Dubilier Sprague	PA-113-2 PC-151 116TM2 DT-2

MISCELLANEOUS

ITEM No.	PART NAME	AUTOMATIC PART No.	NOTES
M1	Lamp	T-47	#51
M2	Tuning Cap.	CV-149	2 Gang (Ant. 43-462mmf, Osc. 34-200mmf)
M3	Clock	C97G245	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

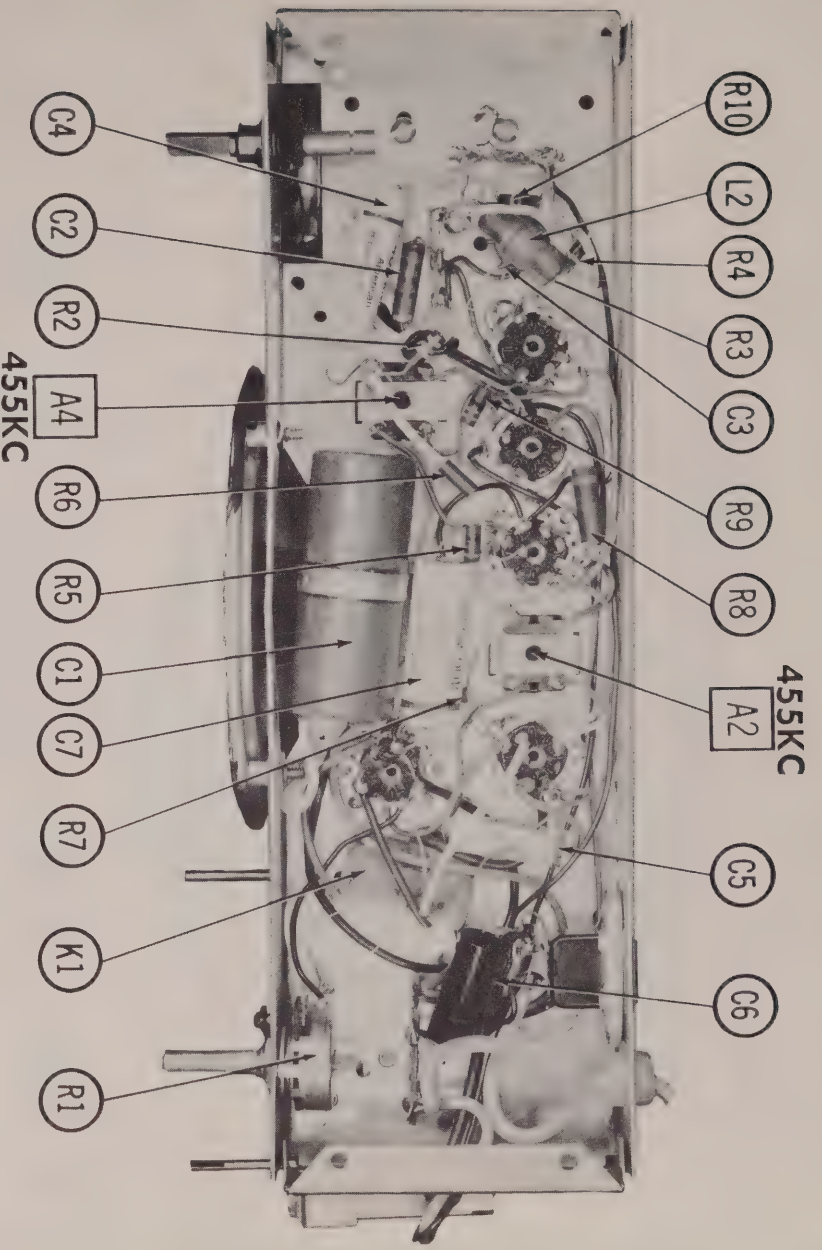
NAME	PART NO.	DESCRIPTION
Knob	H-112	Two used
Knob	H-110	Two used, Clock
Cabinet	H-111	Specify Color
Shadow Box	H-98	Clock
Shadow Box	H-99	Radio
Pointer	PT-100	Dial

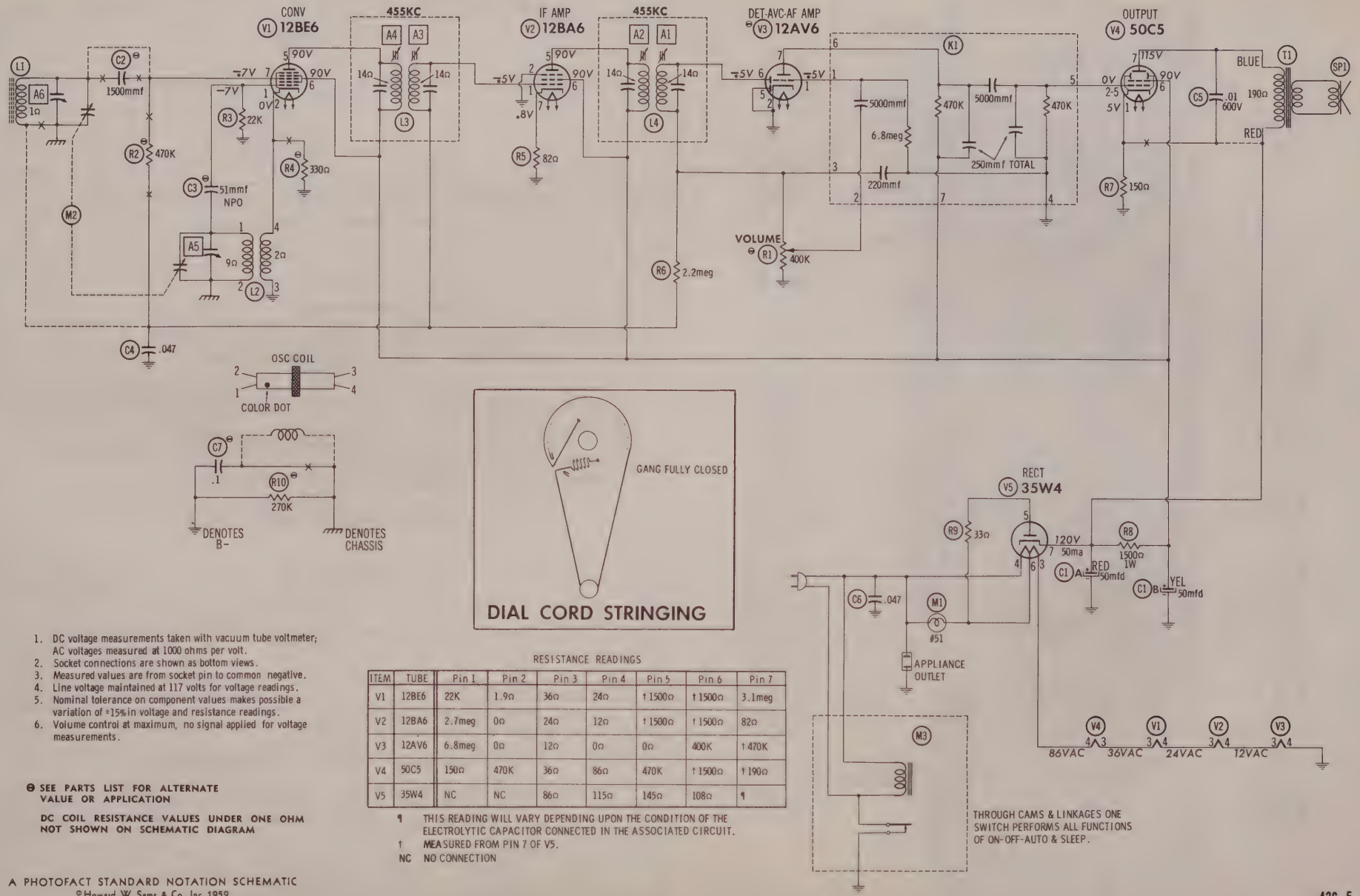
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	1.9Ω	36Ω	24Ω	†1500Ω	†1500Ω	3.1meg
V2	12BA6	2.7meg	0Ω	24Ω	12Ω	†1500Ω	†1500Ω	82Ω
V3	12AV6	6.8meg	0Ω	12Ω	0Ω	0Ω	400K	†470K
V4	50C5	150Ω	470K	36Ω	86Ω	470K	†1500Ω	†190Ω
V5	35W4	NC	NC	86Ω	115Ω	145Ω	108Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

† MEASURED FROM PIN 7 OF V5.

NC NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1959

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

AUTOMATIC MODEL DET-28

AUTOMATIC
MODEL DET-28

TRADE NAME	Automatic Model DET-28 (For 1957 & 1958 DeSoto Automobiles)
MANUFACTURER	Automatic Radio Mfg. Co., Inc., 122 Brookline Ave., Boston 15, Mass.
TYPE SET	Battery Operated Custom Built AM Automobile Receiver with Transistorized Output
TUBES (Four)	Types 12CX6 (or) 12AF6 RF Amplifier, 12AD6 Converter, 12AF6 IF Amplifier, 12J8 Det.-AVC-AF Amp.
POWER SUPPLY	12 Volt Storage Battery — RATING 1.3 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	538-1610KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 12AD6 (V2). Low side to chassis.	262.5KC (400∿ Mod)	High end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1600KC	1600KC	"	A5	"
3.	"	"	600KC	600KC	"	A6	Adjust for maximum output. Repeat steps 2 and 3.
4.	68mmf	High side to antenna input. Low side to chassis.	1400KC	Tune to 1400KC signal	"	A7, A8	Adjust for maximum output.
5.	"	"	600KC	Tune to 600KC signal	"	A9, A10	"
6.	With radio installed in car and antenna fully extended, tune in a weak station near 1400KC and adjust A8 for maximum output.						

PUSHBUTTON ADJUSTMENT

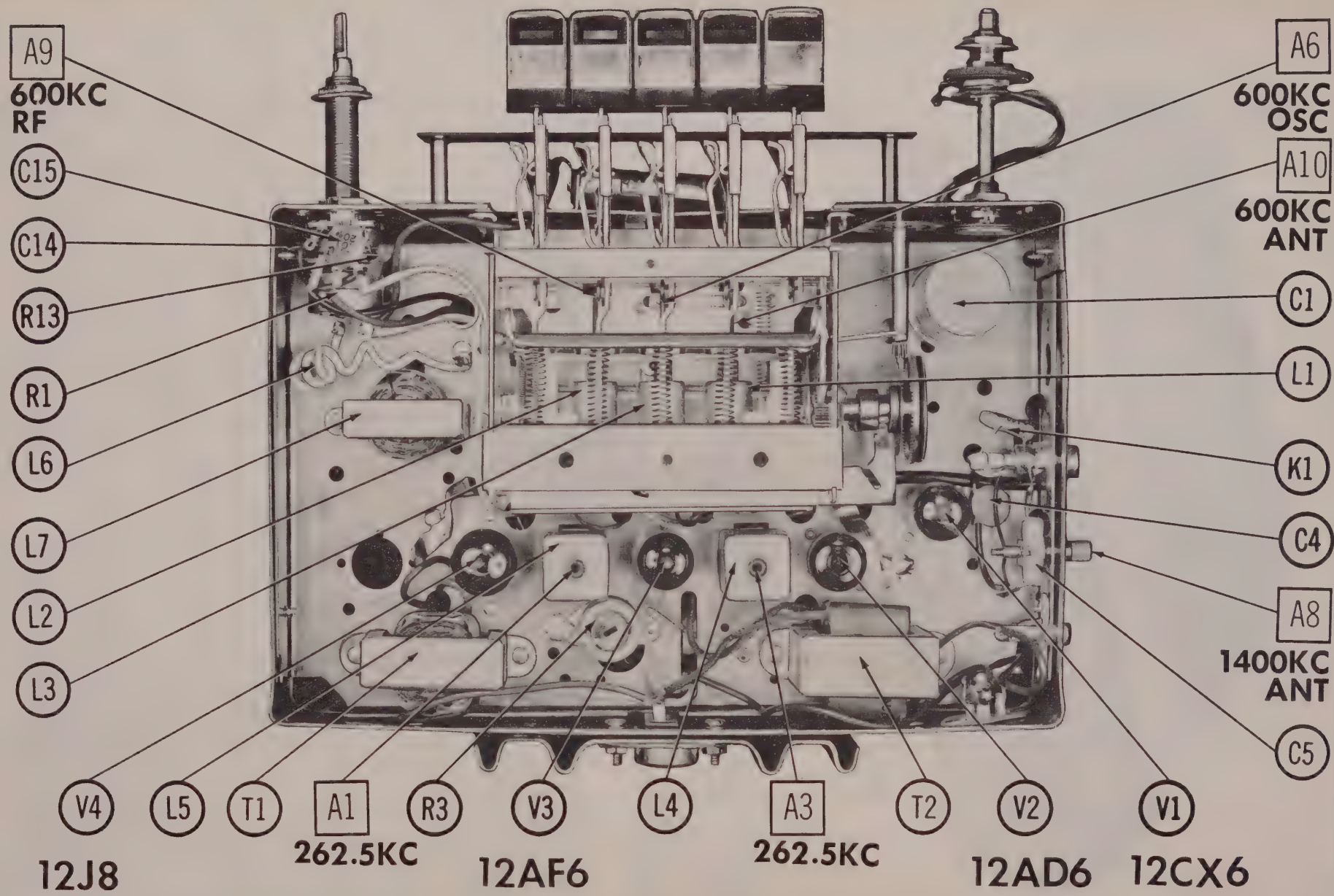
1. Pull pushbutton out.
2. Tune manually to desired station.
3. Press pushbutton in firmly.
4. Repeat for remaining pushbuttons.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

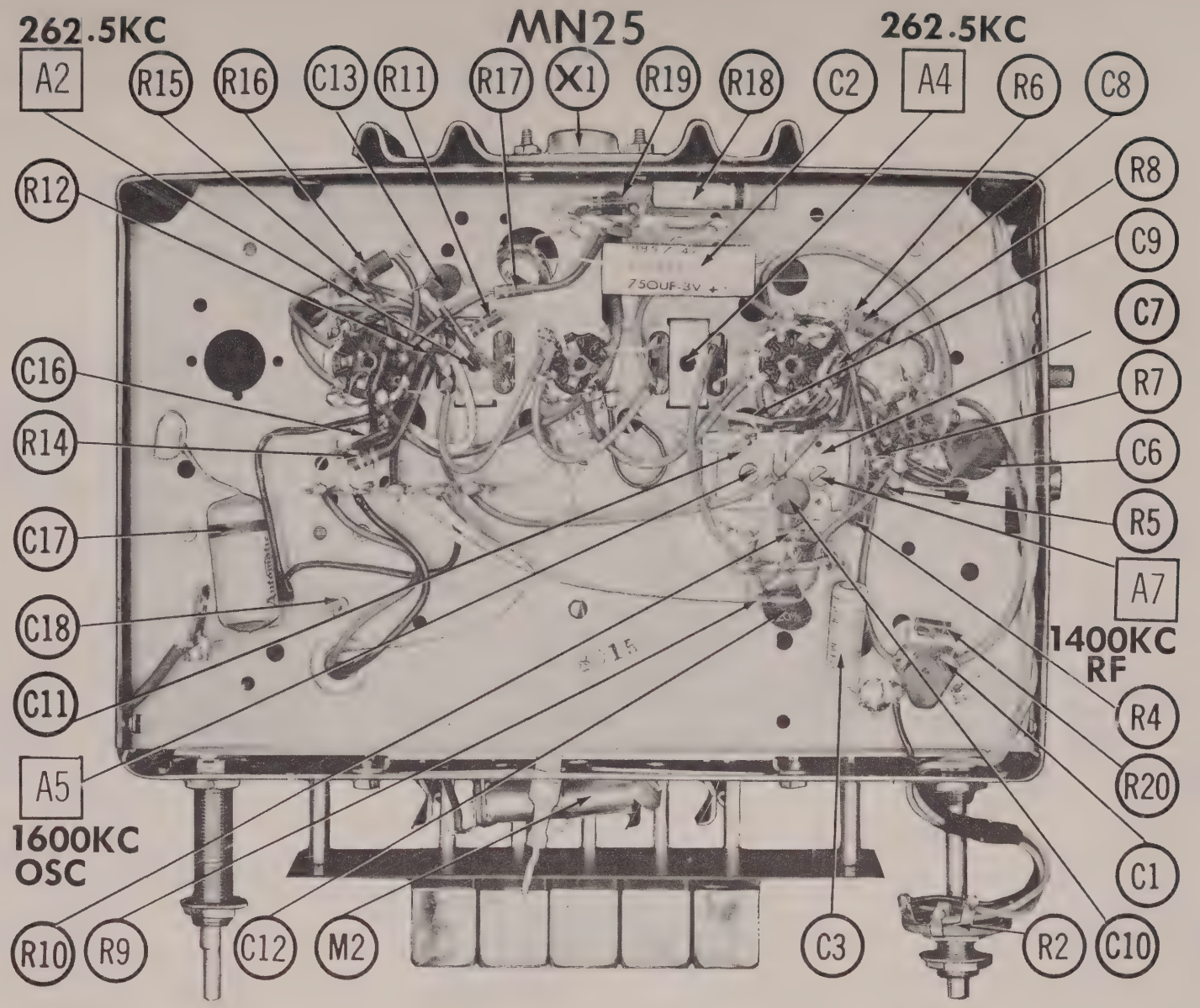
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H756

SET 426 FOLDER 6



CHASSIS - TOP VIEW



CHASSIS - BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12CX6	①
V2	Converter	12AD6	
V3	IF Amplifier	12AF6	
V4	Det. -AVC-AF Amp.	12J8	

① Alternate Type 12AF6.

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	MN25	Output	CBS-2N155			2N242	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	AUTOMATIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▪500	15	20-315	AFH2-02-75	B0045	WP200.7			R2699 *
B	▲150	15							
C2	750	3	20-757						R2701 *

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	AUTOMATIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.047	200	30-473-2	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C4	40		15-400						NPO
C5	5-47		28-800						
C6	3000		15-302	BPD-003	DD-302	BYA10D3	UC-523	5GA-D3	①
C7	3-35		28-400						
C8	12			SI 12	D6-120	LT6Q12	UC-5412	5GA-Q12	
C9	40		15-400						NPO
C10	51		15-510N		TCN-51	C10Q51U			N750 10%
C11	31-230		28-3						②
C12	10000		15-103	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C13	27		15-270	DI-000027	DD-270	L10Q27	UC-5427	5GA-Q27	
C14	2000		15-202	BPD-002	DD-203	BYA10D2	DC522	5HK-D2	
C15	10000		15-103	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C16	10000		15-103	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C17	.47	100	30-474-1	P288N-47		CUB2P47	GEM-2047	2TM-P47	
C18	800		CC-801						

① Not used in some versions. ② Alternate Part #28-281.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AUTOMATIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2meg	½	80A700A	F1-68 †				Tone
B	1meg	½		R2-60				Volume, Tap ⓐ 500K
C	Switch			KB-1 or KR-1*				
R2	25Ω	2(WW)	80A711					Speaker Fader
R3	500Ω	2(WW)	62-501		39-500		FL-600	Transistor Bias

† Use AK-26 adaptor bushing. Saw off to fit.
* Use KR with CRL "red label" controls and KB with "blue label" controls.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		AUTOMATIC PART No.	NOTES
	OHMS	WATT		
R4	1500Ω		60-152S	
R5	150K		60-154S	
R6	2.2meg		60-225S	
R7	4.7meg		60-475S	
R8	47K		60-473	
R9	10meg		60-106	
R10	10meg		60-106	
R11	47K		60-473	
R12	1meg		60-105	

ITEM No.	RATING		AUTOMATIC PART No.	NOTES
	OHMS	WATT		
R13	100K		60-104	
R14	470K		60-474	Note 1
R15	10meg		60-106	Note 2
R16	10Ω		60-100	
R17	330Ω		60-331	
R18	1Ω	2	60-1	
R19	22Ω		60-220	
R20	68Ω		60-680S	

Note 1. Not used in some versions.

Note 2. Some versions use 6.8meg in this application.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		AUTOMATIC PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Ant. Coil	①					
L2	RF Coil	①					
L3	Osc. Coil	①					
L4	Input IF	14-265	16-6752	BC-350	12-H1	RF-3	
L5	Output IF	14-267	16-6754	BC-354	12-H6		
L6	"A" Line Choke	②					1.2 Microhenries ②

① Part of Tuner Assembly. ② Not used in some versions.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ∿)	AUTOMATIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L7	1.3A	9Ω	.008 Hy.	75A601						

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	AUTOMATIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	15 :	1	75A602A						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	AUTOMATIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	20Ω	3-4Ω	75A603C							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	AUTOMATIC PART No.	QUAM PART No.	
SP1	5" x 7"	PM	3-4Ω	73A654 ①	57A21	① Alternate Part #73B654

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	AUTOMATIC PART No.	REPLACEMENT DATA
K1	Antenna Isolation	100mmf, 1.2meg		

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			AUTOMATIC PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	7AG	7½A 32V	108-100		30707.5 (7AG 7½A 32V)	155009	SFE 7½	HDH

MISCELLANEOUS

ITEM No.	PART NAME	AUTOMATIC PART No.	NOTES
M2	Lamp	1891	#1891

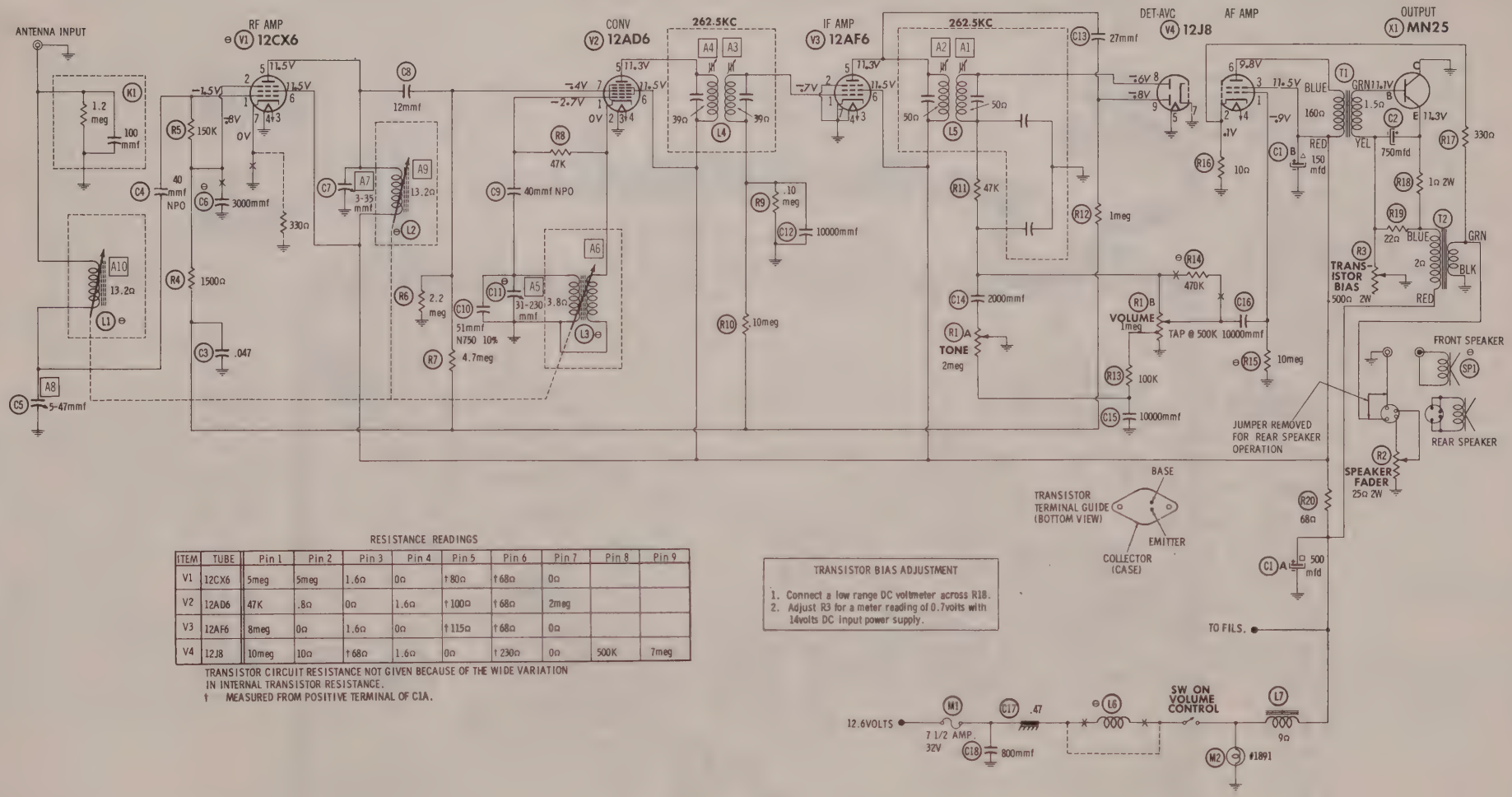
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	48A646	Tuning, On-Off-Volume
Knob	48A648	Tone, Speaker Balance
Cover	52-27	Case, Top
Cover	52B670	Case, Bottom

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire .....Use BELDEN No. 8885
Bonding Strap .....Use BELDEN No. 8661



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12CX6	5meg	5meg	1.6Ω	0Ω	†80Ω	†68Ω	0Ω		
V2	12AD6	47K	.8Ω	0Ω	1.6Ω	†100Ω	†68Ω	2meg		
V3	12AF6	8meg	0Ω	1.6Ω	0Ω	†115Ω	†68Ω	0Ω		
V4	12J8	10meg	10Ω	†68Ω	1.6Ω	0Ω	†230Ω	0Ω	500K	7meg

TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
† MEASURED FROM POSITIVE TERMINAL OF C1A.

TRANSISTOR BIAS ADJUSTMENT

1. Connect a low range DC voltmeter across R18.
2. Adjust R3 for a meter reading of 0.7volts with 14volts DC input power supply.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes posssible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

PHOTOFACT* Folder

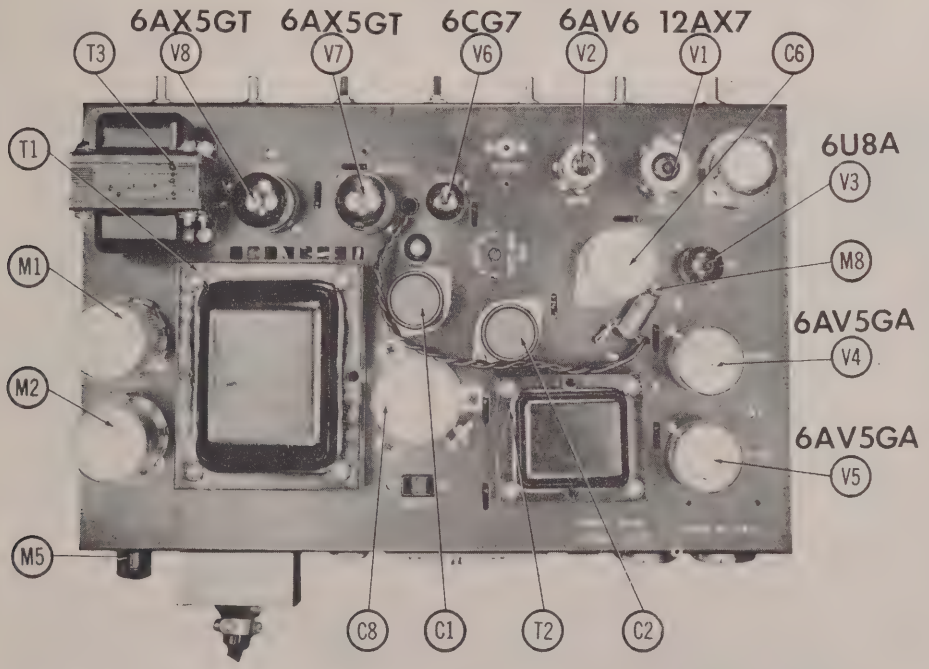
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

DAVID BOGEN
MODELS K1630, K1630Y

DAVID BOGEN
MODELS K1630, K1630Y

MODEL K1630Y

TRADE NAME	David Bogen Models K1630, K1630Y
MANUFACTURER	David Bogen Co., P. O. Box 500, Paramus, N. J.
TYPE SET	AC-Battery Operated 3 Channel 30 Watt Audio Amplifier (Model K1630 Does Not Have Record Player)
TUBES (Eight)	Types 12AX7 Mic 1 Preamp. - Mic 2 Preamp., 6AV6 AF Mixer, 6U8A AF Amp. - Phase Inverter, (2) 6AV5GA Output, 6CG7 Volt. Reg. - Volt. Cont., (2) 6AX5GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles (or) 6 Volt Storage Battery (or) 12 Volt Storage Battery
RATING	1.2 Amp. @ 117 Volts AC, 125 Watts (or) 15 Amp. @ 6.3 Volts DC (or) 10 Amp. @ 12.6 Volts DC

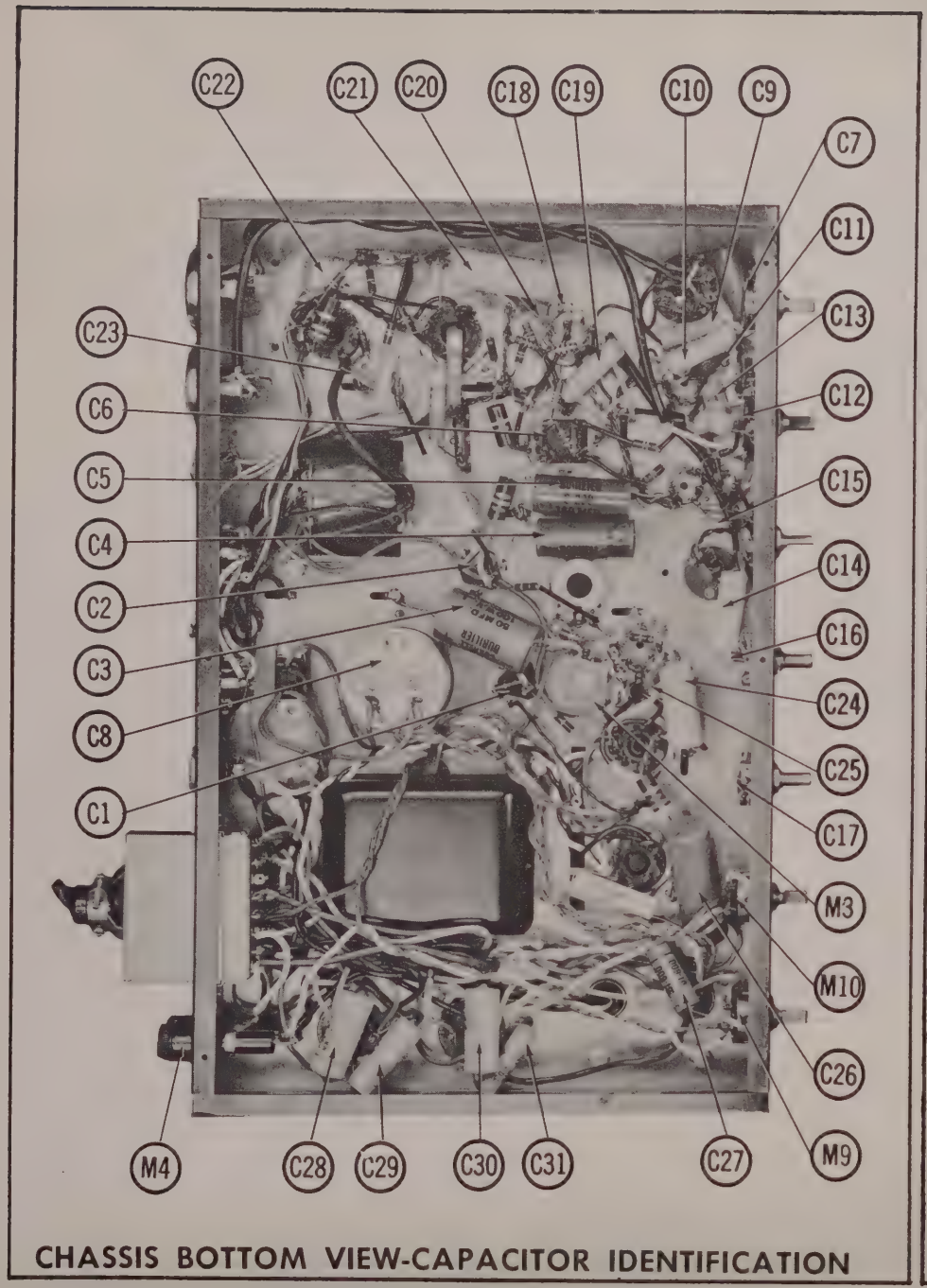


HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

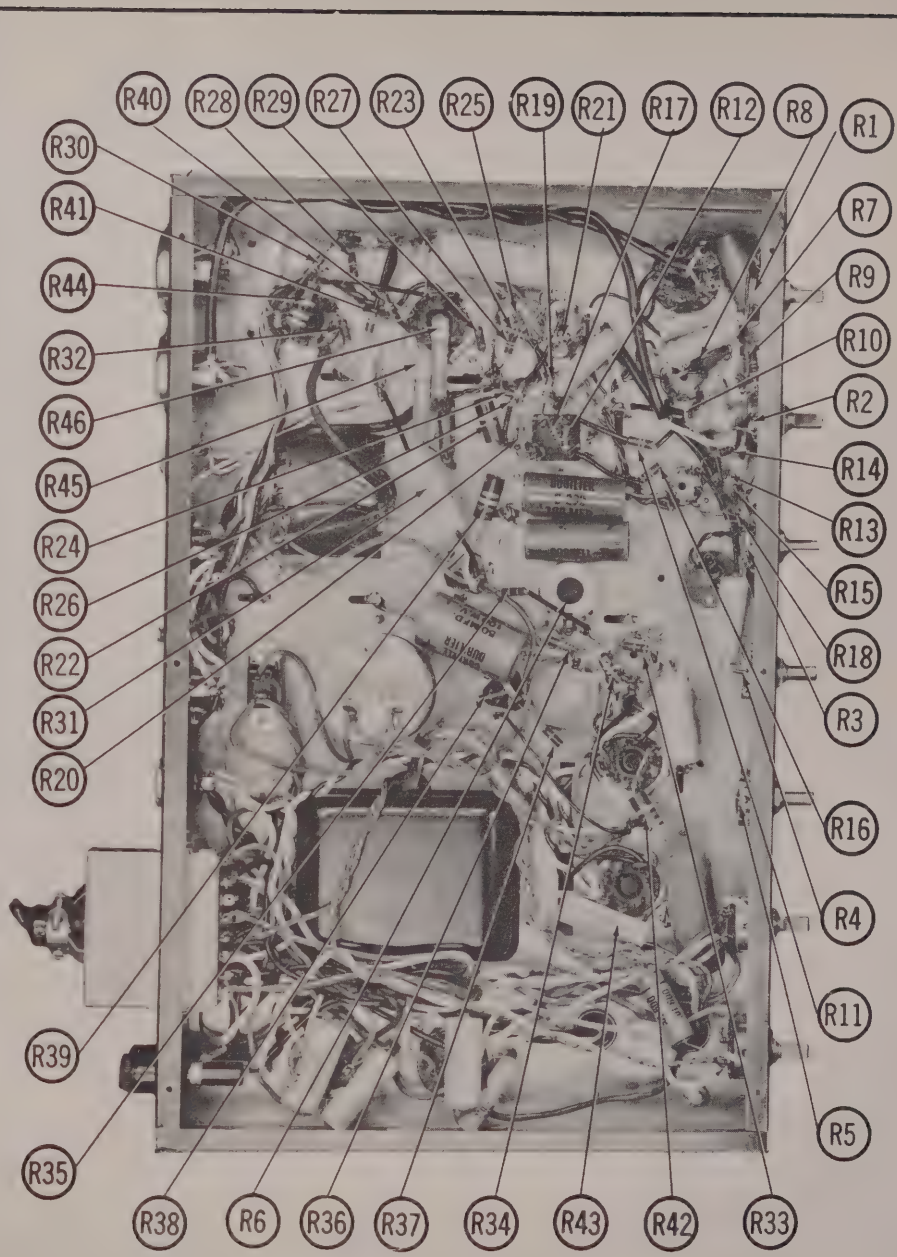
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H704

SET 426 FOLDER 7



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Mic 1 Preamplifier-		
	Mic 2 Preamplifier	12AX7	
V2	AF Mixer	6AV6	
V3	AF Amp. - Phase Inverter	6U8A	
V4	Output	6AV5GA	
V5	Output	6AV5GA	
V6	Volt. Reg. - Volt. Cont.	6CG7	
V7	Rectifier	6AX5GT	
V8	Rectifier	6AX5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	David Bogen PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	30	400		AFH1-51	A0470	FP145	TMS-56	S-265	TVL-1720
C2	30	400		AFH1-51	A0470	FP145	TMS-56	S-265	TVL-1720
C3	50	100		PRS150V50	BR5015	TC49	TD-50-150	MT-1550	TVA-1414
C4	100	25		PRS25V100	BBR100-25	TC2501	TD-100-25	MTH-2510	TVA-1207
C5	100	25		PRS25V100	BBR100-25	TC2501	TD-100-25	MTH-2510	TVA-1207
C6A	▲20	450		AFH4-19-10	D0179.3	FP474.5	TMQ-113	Q-035	TVL-4826
B	■20	450						MT-4510	
C	10	350							
D	▲10	350							
C7	5	200		PRS250V4	BBR4-250	TC50X	TD-4-250	MT-4504	TVA-1501
C8	5	220AC		RR717A	CRX3050	RP-3305			7522-5

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	David Bogen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C9	.033	200		P288N-033	DF-303	CUB6S33	GEM-4133	6TM-S33	
C10	.033	400		P488N-033	DF-303	CUB6S33	GEM-4133	6TM-S33	
C11	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C12	.033	200		P288N-033	DF-303	CUB6S33	GEM-4133	6TM-S33	
C13	.033	400		P488N-033	DF-303	CUB6S33	GEM-4133	6TM-S33	
C14	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C15	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C16	820								10%
C17	3300								10%
C18	2.4								±.25mmf
C19	.047	200		P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C20	100			NPO-DI 100	DD-101	L10T1	ZT-531	5TCC-T1	10%
C21	.1	600		P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C22	.1	600		P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C23	3300								10%
C24	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C25	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C26	.02	2000							
C27	.01	600		P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	
C28	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C29	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C30	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C31	.047	200		P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	David Bogen PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	V367	B-60	A47-500K-Z	Q13-133	U48	Mic 1
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2A	500K	½	V367	B-60	A47-500K-Z	Q13-133	U48	Mic 2
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	500K	½	V367	B-60	A47-500K-Z	Q13-133	U48	Phono
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	2meg	½	V407	B-76	A47-2meg-Z	Q13-139	U55	Bass
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R5A	500K	½	V367	B-60	A47-500K-Z	Q13-133	U48	Treble
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R6A	100K	½	V392A	AB-40	A47-100K-S	B11-128	TA15L	Volt Reg Adj
B	Shaft			AK-1	FKS-1/4	TM1	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		David Bogen PART No.	NOTES
	OHMS	WATT		
R7	3.3meg			
R8	100K			
R9	47K			
R10	3.3meg			
R11	100K			
R12	47K			
R13	220K			
R14	220K			
R15	470K			
R16	68K			
R17	33K			
R18	1000Ω			
R19	470K			
R20	15K			
R21	390K			
R22	200K 5%	2		
R23	22K			
R24	390Ω			
R25	22K			
R26	100K			

ITEM No.	RATING		David Bogen PART No.	NOTES
	OHMS	WATT		
R27	150K			
R28	220K			
R29	15Ω 5%			
R30	220K			
R31	1000Ω	7		
R32	15Ω 5%			
R33	1meg			
R34	680K			
R35	2.7meg			
R36	68K			
R37	1meg			
R38	1meg			
R39	27K	2		
R40	150K			
R41	15K			
R42	4700Ω	2		
R43	20Ω	7		
R44	33Ω	2		
R45	.47Ω	1(WW)		
R46	.47Ω	1(WW)		

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	AC OPERATION			David Bogen PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
	PRI.	SEC. 1	SEC. 2							
T1	117VAC @ 1.2A	850VCT @ .060A Tap @ 35VAC	9VCT @ 1.75A	T3166-1						
	SEC. 3	From CT								
	9VCT @ 1.75A	@ .001A								
	DC OPERATION									
	PRI. 1*	PRI. 2*	SEC. 1							
	6VDC @ 2A (or)* 12VDC @ 1A	6VDC @ 2A (or)* 12VDC @ 1A	800VCT @ .055A Tap from CT 35VAC @ .001A							
	SEC. 2									
	100VAC Not Used									

* Primary windings in parallel for 12VDC operation and in series for 6VDC operation.

TRANSFORMER (PHONO)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI. 1*	PRI. 2*	SEC. 1	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	6VDC @ 1A (or)* 12VDC @ .5A	6VDC @ 1A (or)* 12VDC @ .5A	117VAC @ .150A	T318-12						

* Primary windings in parallel for 12VDC operation and in series for 6VDC operation.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC. 1	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T3	5000Ω CT	167Ω or 70V	T2128							
		SEC. 2								
		16Ω Tap @ 8Ω, 4Ω								

PARTS LIST AND DESCRIPTIONS (Continued)

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FRE-QUENCY	REPLACEMENT DATA				NOTES
				David Bogen PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6.3V	60~	H505	5560		5560	Phono Motor Power

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FRE-QUENCY	REPLACEMENT DATA				NOTES
				David Bogen PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M2	Interrupter	6.3V	115~	H507	5715		5715	Amplifier Power

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	David Bogen PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M3	.0006A	H373	1159	D-5410	10	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			David Bogen PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M4	3AG	2A 125V S/B			313002. (2A 125V S/B)	342001	MDL2	HKP
M5	3AG	20A 32V			311020. (20A 32V)	342001	SFE20	HKP

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	David Bogen PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M6		420TS * P-310-T	N8-1 & N8-3			* Tone arm complete with cartridge.

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	David Bogen PART No.	JENSEN PART No.	WALCO PART No.	
M7	(78)	† CRA-55 or ♦ CRA-55D	† W-64S or ♦ W-64D	† Jewel ♦ Diamond
	(LP)	† CRA-55LP or ♦ CRA-55LPD	† W-64MGS or ♦ W-64MGD	

MISCELLANEOUS

ITEM No.	PART NAME	David Bogen PART No.	NOTES
M8	Lamp		#51
M9	Switch	S-466	Power, Off-On, Rotary, Snap Type
M10	Switch		Phono Motor, Off-On, Rotary, Snap Type

WIRING DATA

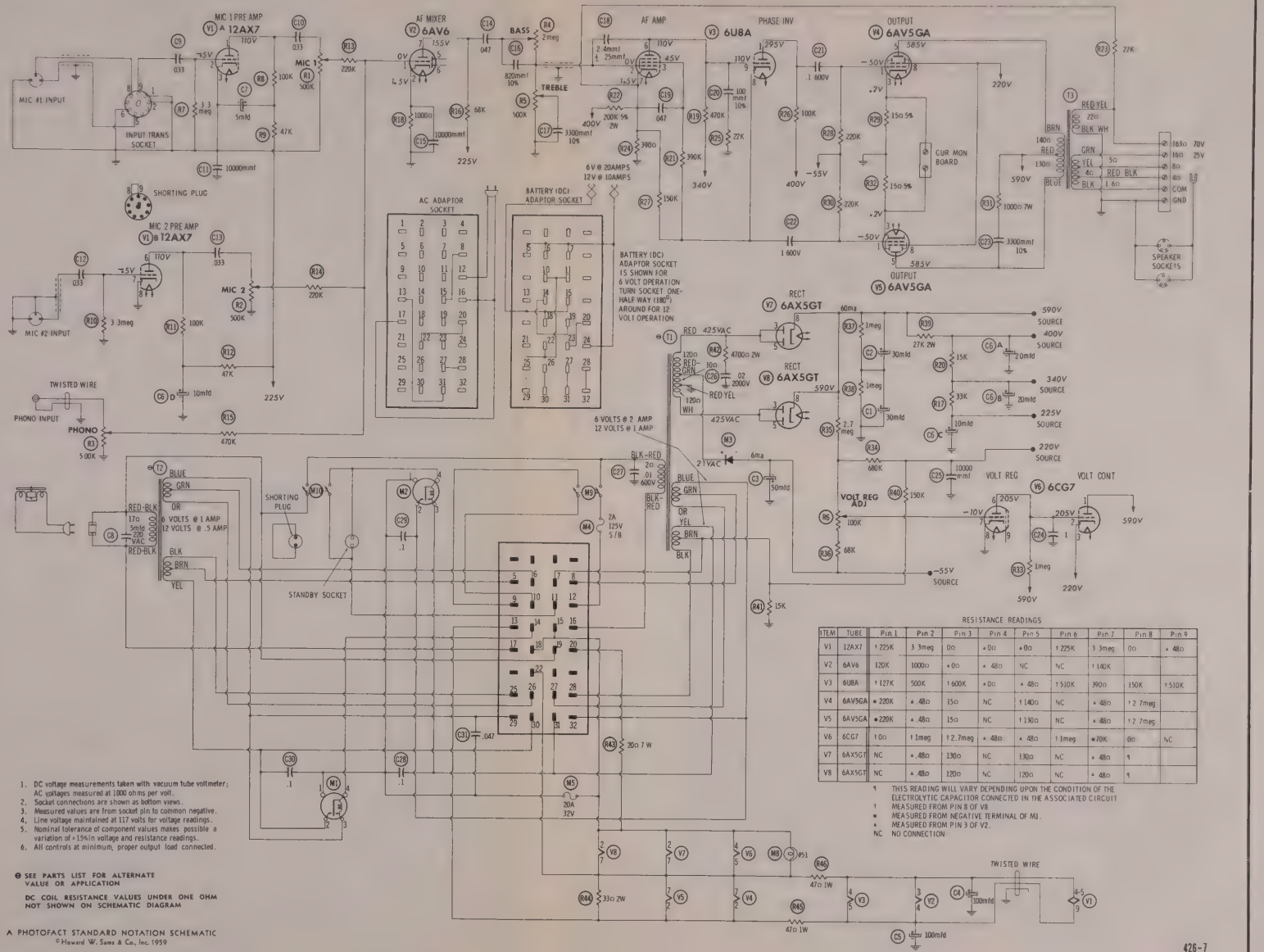
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

VOLTAGE REGULATOR ADJUSTMENT (R6)

The adjustment should be checked if V4, V5 or V6 is replaced.

1. Turn volume controls (R1, R2, R3) and Volt Reg control (R6) to minimum.
2. Connect an accurate low range DC voltmeter from one terminal of the CUR MON board to chassis.
3. SLIGHTLY turn the Volt Reg control until a slight meter deflection is observed. Note the reading.
4. Measure the voltage on the other terminal of the CUR MON board. Keep the meter connected to that terminal which indicates the highest voltage.
5. Adjust the Volt Reg control for a meter reading of .25 volts.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	↑225K	3.3meg	0Ω	▲0Ω	▲0Ω	↑225K	3.3meg	0Ω	▲48Ω
V2	6AV6	120K	1000Ω	▲0Ω	▲48Ω	NC	NC	↑140K		
V3	6U8A	↑127K	500K	↑600K	▲0Ω	▲48Ω	↑510K	390Ω	150K	↑510K
V4	6AV5GA	●220K	▲48Ω	15Ω	NC	↑140Ω	NC	▲48Ω	↑2.7meg	
V5	6AV5GA	●220K	▲48Ω	15Ω	NC	↑130Ω	NC	▲48Ω	↑2.7meg	
V6	6CG7	↑0Ω	↑1meg	↑2.7meg	▲48Ω	▲48Ω	↑1meg	●70K	0Ω	NC
V7	6AX5GT	NC	▲48Ω	130Ω	NC	130Ω	NC	▲48Ω	¶	
V8	6AX5GT	NC	▲48Ω	120Ω	NC	120Ω	NC	▲48Ω	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT
↑ MEASURED FROM PIN 8 OF V8
● MEASURED FROM NEGATIVE TERMINAL OF M1.
▲ MEASURED FROM PIN 3 OF V2.
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1959

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

EMERSON MODELS 893B, 894B (Ch. 120430B, 120432B)

EMERSON MODELS 893B, 894B (Ch. 120430B, 120432B)

MODEL 893B

EMERSON MODELS 893B, 894B (Ch. 120430B, 120432B)

TRADE NAME	Emerson Models 893B (Ch. 120430B, 894B (Ch. 120432B)
MANUFACTURER	Emerson Radio & Phono Corp., 14th & Coles Street, Jersey City 2, N. J.
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES (Three)	Types 12AT6 AF Amplifier, 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .25 Amp. @ 117 Volts AC (23 Watts) Less Motor.

FOR SERVICE INFORMATION ON RECORD CHANGER PART #819121-- SEE SIMILAR V-M 1200A--PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H745

SET 426 FOLDER 8

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AT6	

ITEM No.	USE	TYPE	NOTES
V2	Output	50C5	
V3	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	EMERSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	20	150	925444	PRS150V30	BBRT33315	TCT3113	TDLT-2	FMT-1530	TVA-3444
B	30	150		3020					
C	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	EMERSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	400	923554	P488N-047		CUB4S47	GEM-4147		
C3	.047	400	921554	P488N-047		CUB4S47	GEM-4147		
C4	.01	400	923514	P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C5	.0047	400	923553	P488N-0047	D6-472	CUB6D47	GEM-6247	6TM-D47	
C6	.022	400	923524	P488N-022		CUB4S22	GEM-4122	4TM-S22	
C7	.022	400	923524	P488N-022		CUB4S22	GEM-4122	4TM-S22	
C8	.047	400	923554	P488N-047		CUB4S47	GEM-4147	4TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	EMERSON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2meg	½	390543	B-76	A47-2meg-Z	Q13-139	U55	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2A	500K	½	390556	B-59	A47-500K-S	Q11-133	U50	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

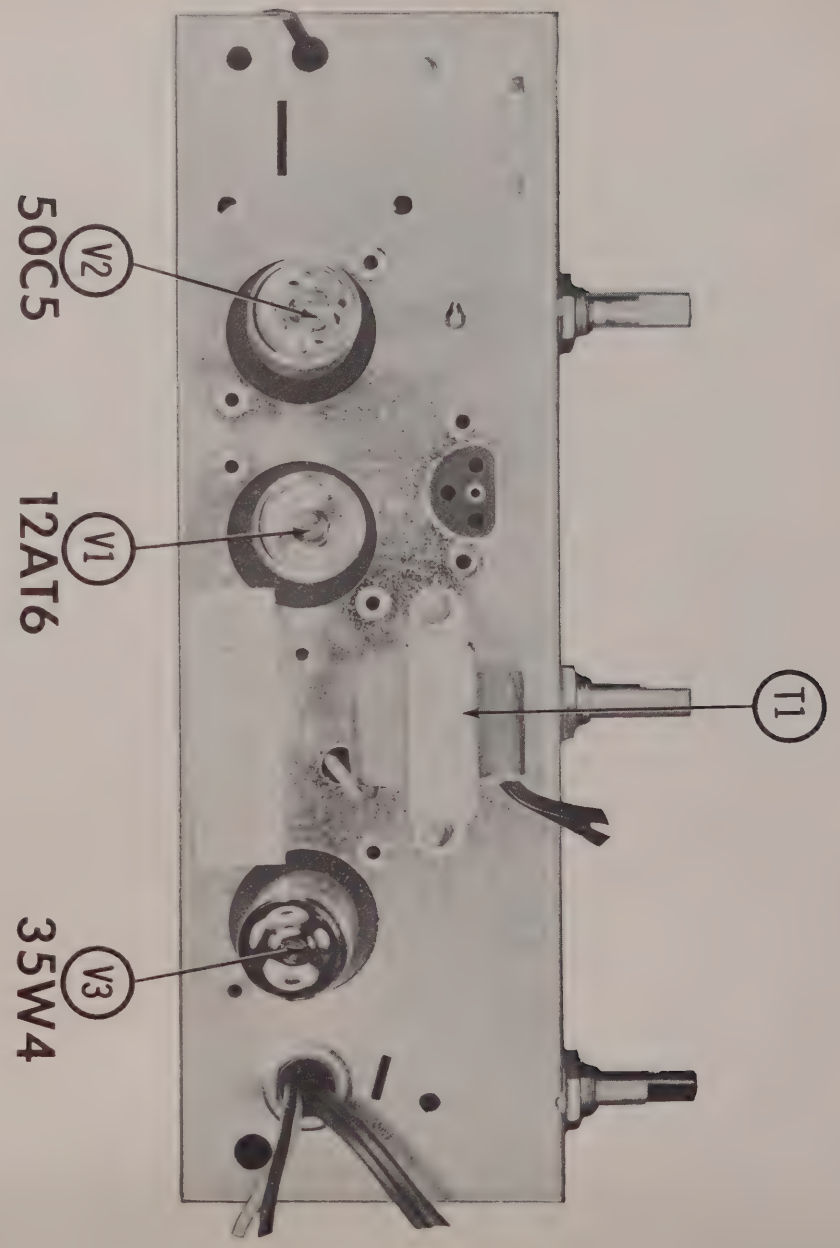
ITEM No.	RATING		EMERSON PART No.	NOTES
	OHMS	WATT		
R3	820Ω		340742	
R4	2200Ω		340572	
R5	3300Ω		340612	
R6	10meg		351452	
R7	470K		351132	
R8	470K		351132	

ITEM No.	RATING		EMERSON PART No.	NOTES
	OHMS	WATT		
R9	150Ω		340292	
R10	4700Ω		350652	
R11	100Ω	1	370252	
R12	18Ω		340072	
R13	133Ω	5	394144	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	EMERSON PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2200Ω	6-8Ω	734165							

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	EMERSON PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	180152 ①	4A07 ③	① Used in Chassis 120430B
SP2	4"	PM	3-4Ω	180152 ①	4A07 ③	② Used in Chassis 120432B
	8"	PM	6-8Ω	180165 ②	8A6	③ Cut Off One Corner To Fit.
	$3\frac{1}{2}$"	PM	3-4Ω	180164 ②	3A07	
	$3\frac{1}{2}$"	PM	3-4Ω	180164 ②	3A07	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	EMERSON PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	961865 ①	55-T or 81-TB	GD-J			① Includes Needle

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	EMERSON PART No.	JENSEN PART No.	WALCO PART No.	
M2	960827 ①	† S-66 or †♦ S-66SD or ♦ S-66D	† W-75TPS or †♦ W-75DS or ♦ W-75TPD	† Jewel ♦ Diamond

① Includes Selector Bar.

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M3	Lamp	807000	#47
M4	Switch	510135	Power On-Off, SPST, Rotary, Snap Type

CABINETS & CABINET PARTS

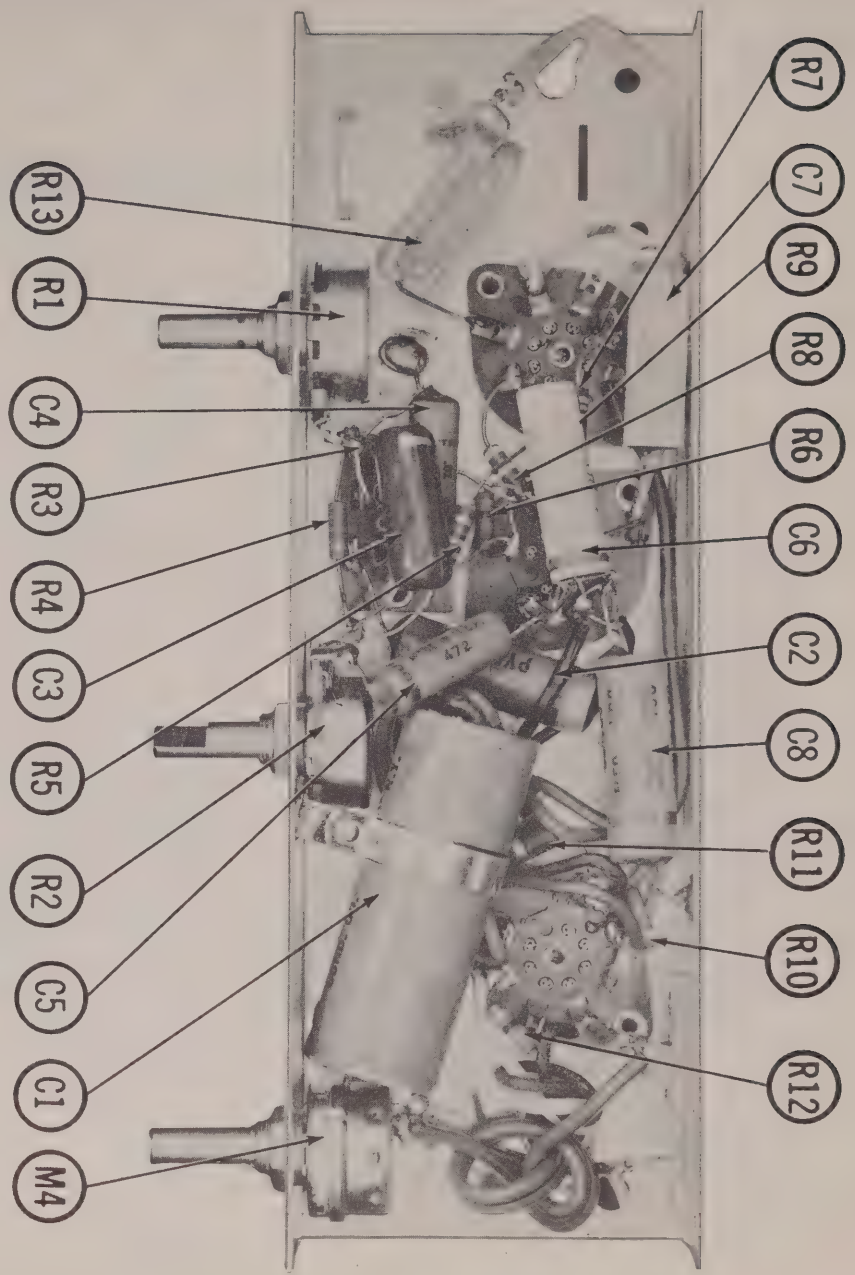
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

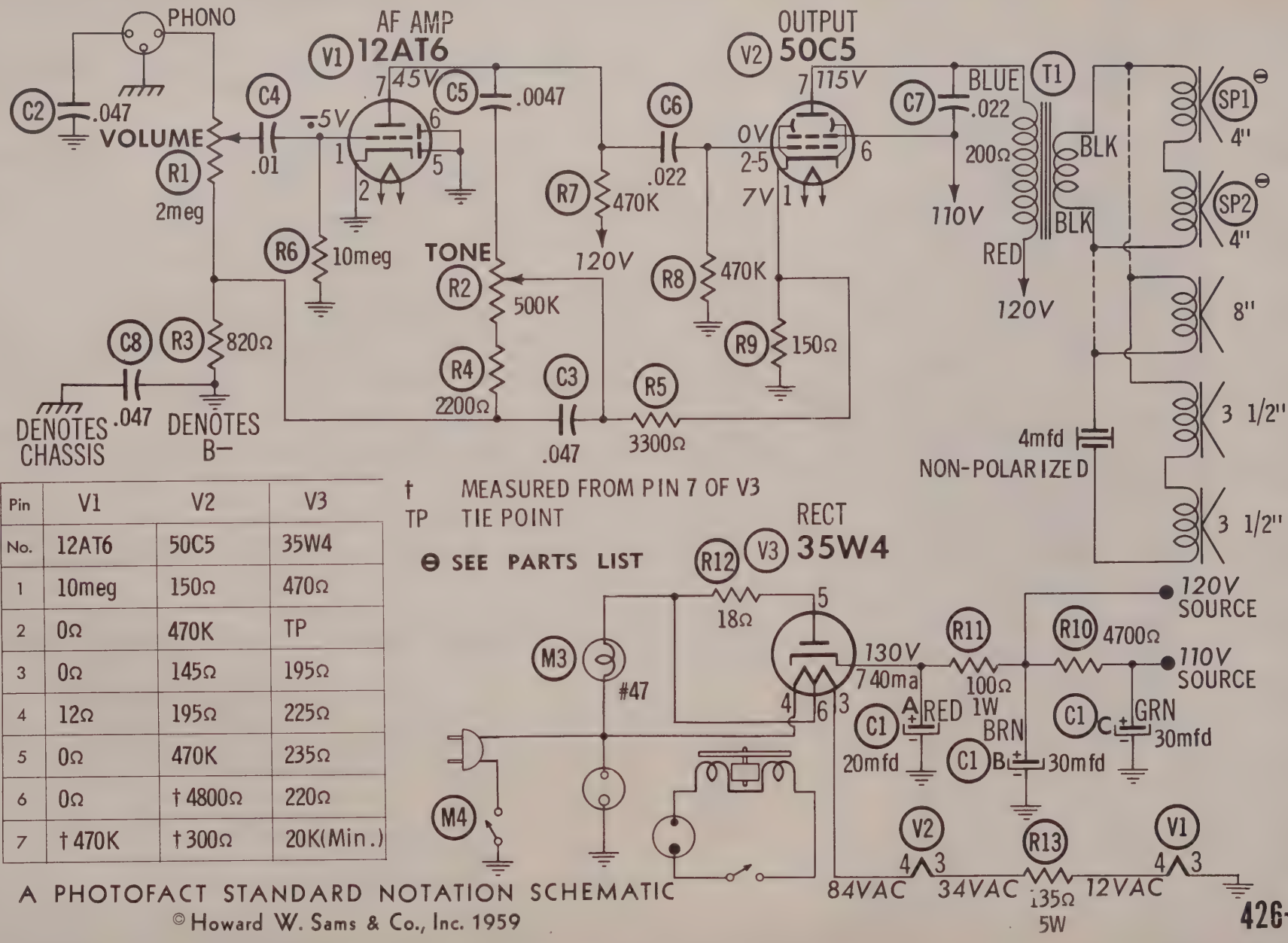
NAME	PART NO.	DESCRIPTION
Knob	460930	3 Used, Model 893B
Knob	461011	3 Used, Model 894B
Knob	961842	On-Off, Record Changer

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K ($7\frac{1}{2}$ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW





Pin	V1	V2	V3
No.	12AT6	50C5	35W4
1	10meg	150Ω	470Ω
2	0Ω	470K	TP
3	0Ω	145Ω	195Ω
4	12Ω	195Ω	225Ω
5	0Ω	470K	235Ω
6	0Ω	†4800Ω	220Ω
7	†470K	†300Ω	20K(Min.)

† MEASURED FROM PIN 7 OF V3

TP TIE POINT

⊖ SEE PARTS LIST

A PHOTOFACT STANDARD NOTATION SCHEMATIC

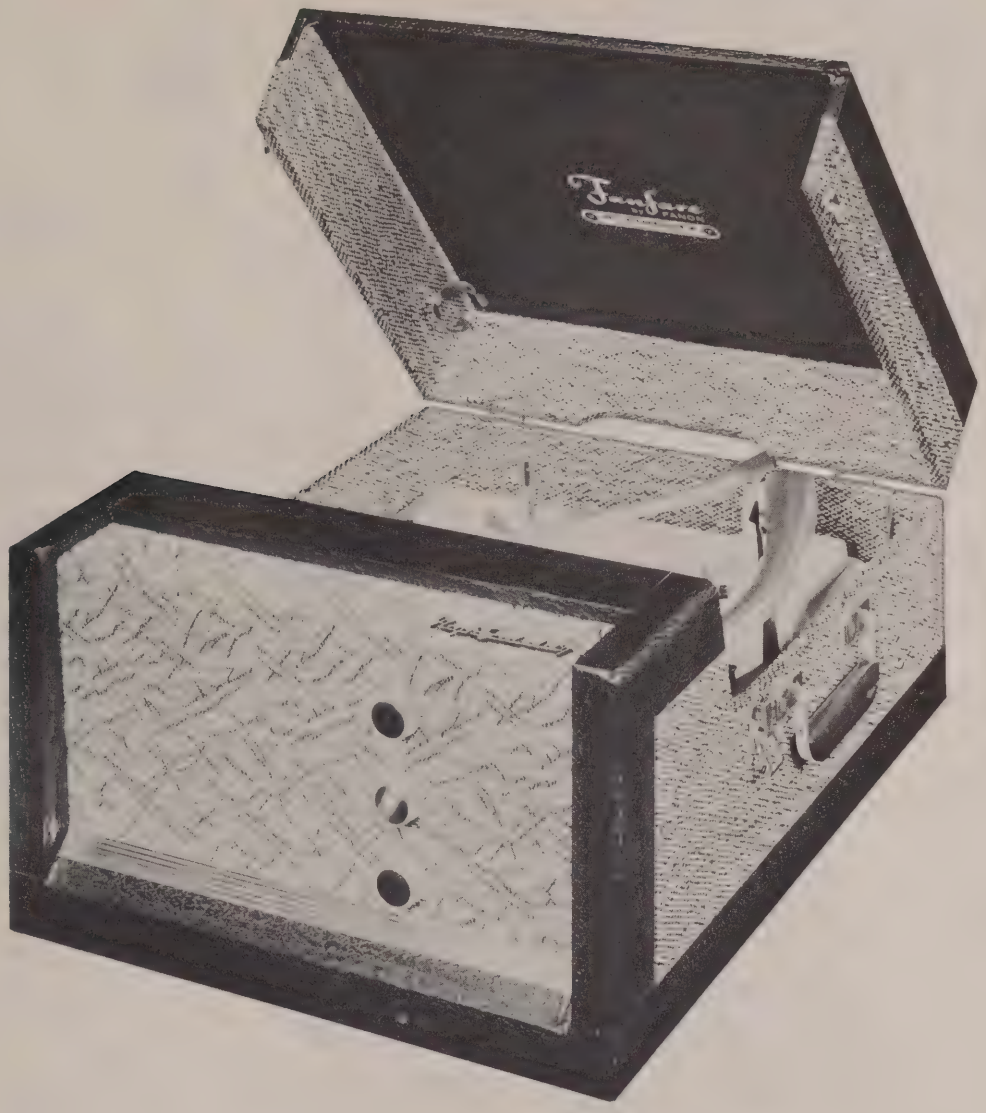
© Howard W. Sams & Co., Inc. 1959

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

FANFARE
MODEL 533VM

FANFARE
MODEL 533VM



FANFARE
MODEL 533VM

TRADE NAME	Fanfare Model 533VM
MANUFACTURER	Fanon Electronic Sales Corp., 919 Park Place, Brooklyn 13, N. Y.
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES (Four)	Types 12AV6 AF Amplifier, 12AX7 AF Amp. -Phase Inv., (2) 50C5 Output
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .32 Amp. @117 Volts AC (28 Watts) Less Motor

FOR SERVICE INFORMATION ON RECORD CHANGER -- SEE SIMILAR V-M 1200A--
PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10.

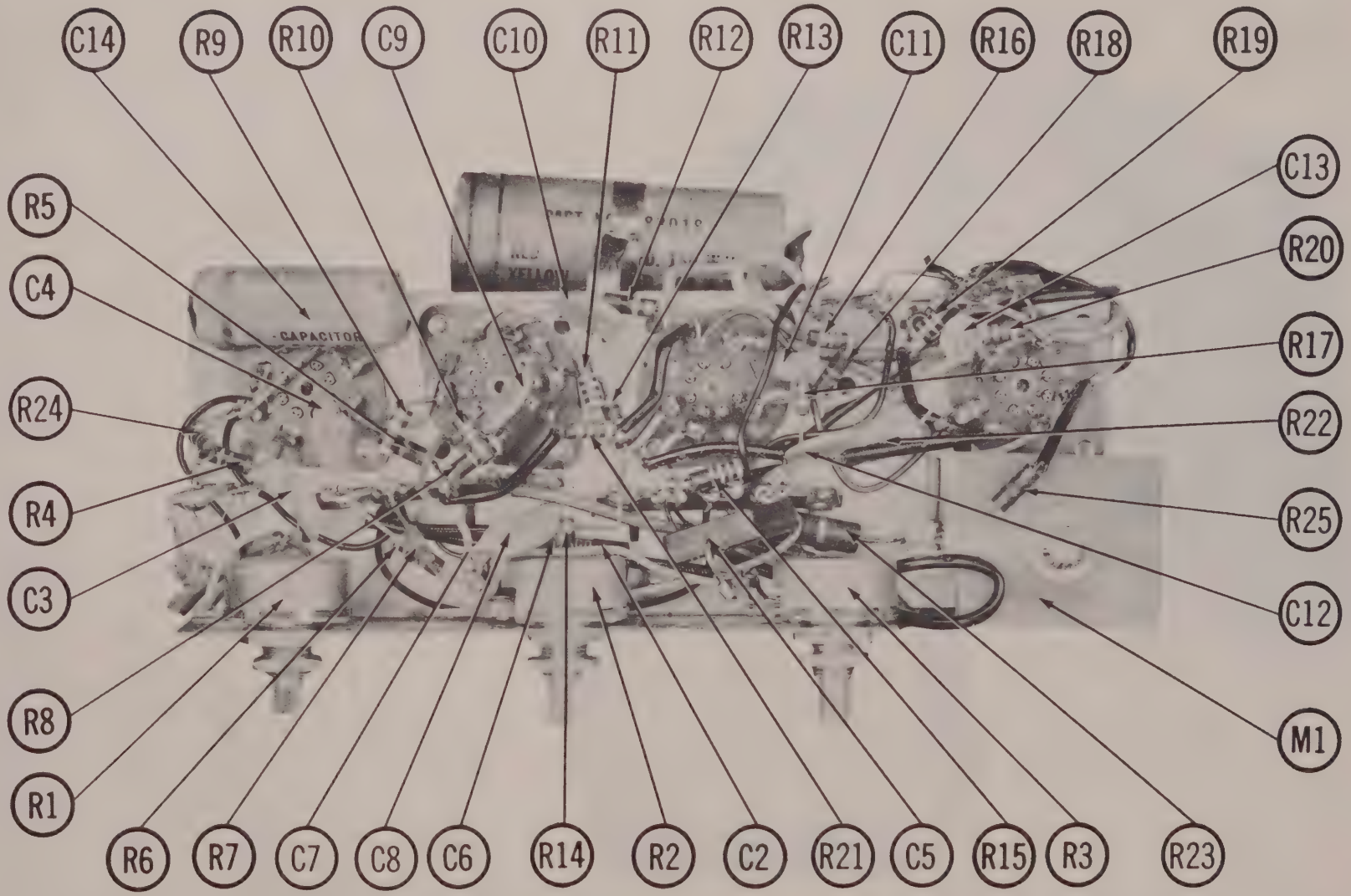
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H782

DATE 1-59 SET 426 FOLDER 9

SET 426 FOLDER 9



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AV6	
V2	AF Amp. -Phase Inv.	12AX7	
V3	Output	50C5	
V4	Output	50C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA FANFARE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	80	150		PRS150V80	BBRT84215	TCT3117	TDLT-7	FMT-339	TVA-3455
B	40	150		4020					
C	20	150							
C2	10	100		PRS150V10	BBR10-150	TC52	TD-10-150	MT-1510	TVA-1406

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA FANFARE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C4	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C5	300			SI300	D6-301	LT6T3	UC-533	5GA-T3	①
C6	300			1468-0003	DD-301	5W5T3	MC-241	1FM-33	①
C7	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C8	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C9	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C10	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C11	2000			BPD-002	DD-202	BYA10D2	DC522	5HK-D2	
C12	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C13	2000			BPD-002	DD-102	BYA10D2	DC522	5HK-D2	
C14	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	

① Some versions may use 270mmf in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA FANFARE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500K		CM20770	B-60				Loudness
R2	2meg		CM16669	B-76				Bass
R3	2meg		CM16669	B-76				Treble

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	FANFARE PART No.	NOTES
R4	15meg			
R5	100K			
R6	470K			
R7	12K			
R8	470K			
R9	4700Ω			
R10	27K			Note 1
R11	470K			
R12	100K 5%			
R13	4700Ω			
R14	100K 5%			
R15	470K			

ITEM No.	RATING OHMS	RATING WATT	FANFARE PART No.	NOTES
R16	47K			
R17	47K			
R18	150Ω			
R19	470K			
R20	47K			
R21	47K			
R22	2200Ω			
R23	120Ω	1		Note 2
R24	47K			
R25	10Ω			
R26	150Ω			

Note 1. Not used in some versions.
Note 2. Some versions may use 150Ω 1W in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA FANFARE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	4900Ω CT	1-2Ω	32-8316-9	Z1000 ①	A-2900①	AU-608①	A-3856 ①	24S60 ①	S-51X ①	① Drill new mounting hole

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA FANFARE PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	8"	PM	3-4Ω	①	8A21 ①	① Parallel And Phase
SP2	5"	PM	3-4Ω	①	5A1R ①	
SP3	3"	Electrostatic		LSH75		

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA FANFARE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.069A		1235AH	RS100	100A	① Silicon Type
				SD-92①	K200 ①	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA FANFARE PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	REMARKS
M2		81-T				

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

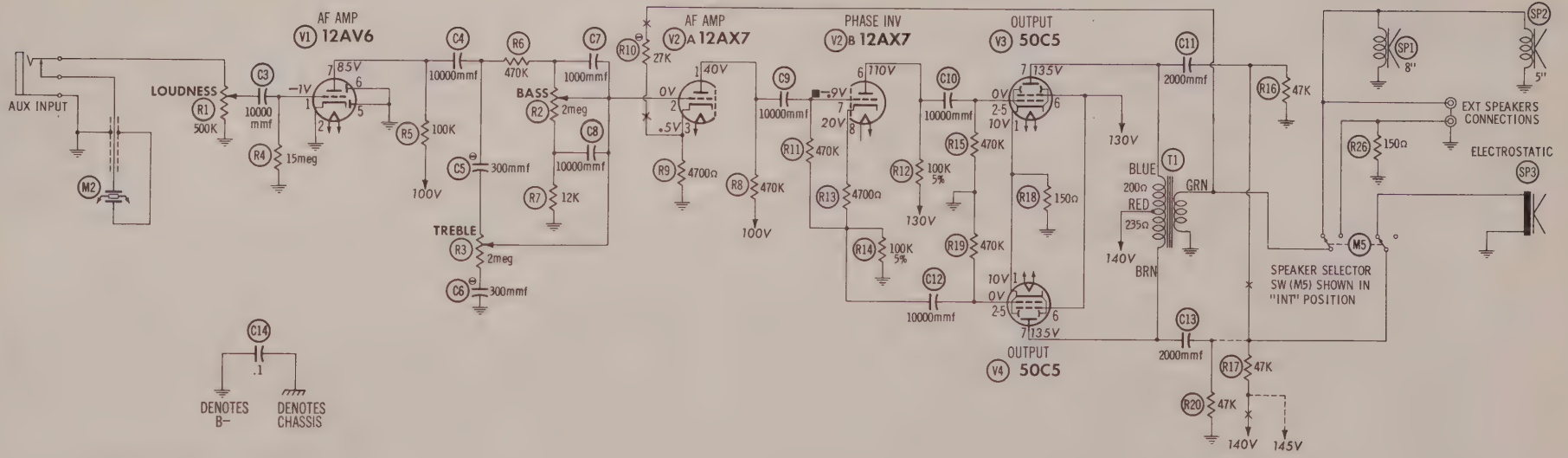
ITEM No.	REPLACEMENT DATA FANFARE PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M3				

MISCELLANEOUS

ITEM No.	PART NAME	FANFARE PART No.	NOTES
M4	Lamp		#NE-2
M5	Switch		Internal-External Speakers, DPDT, Toggle Type

WIRING DATA

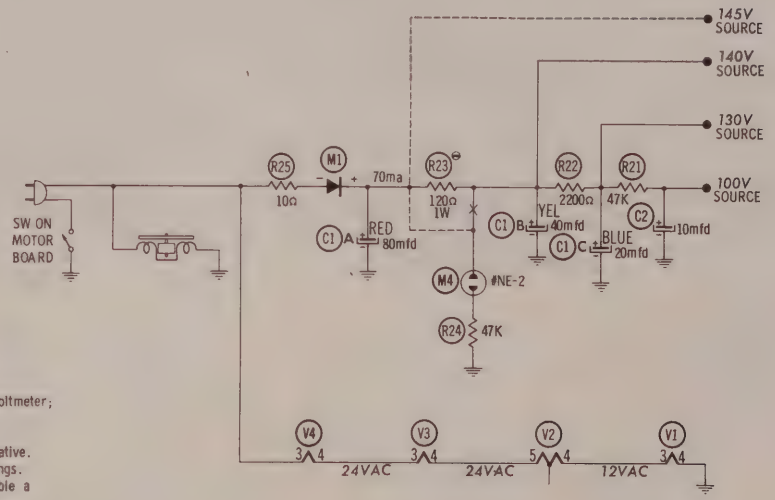
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AV6	15meg	0Ω	0Ω	12Ω	0Ω	0Ω	† 150K		
V2	12AX7	† 510K	12K	3800Ω	12Ω	24Ω	† 100K	570K	100K	18Ω
V3	50C5	150Ω	470K	74Ω	24Ω	470K	† 2300Ω	† 320Ω		
V4	50C5	150Ω	470K	120Ω	74Ω	470K	† 2300Ω	† 355Ω		

† MEASURED FROM OUTPUT OF M1.
■ MEASURED FROM PIN 8 OF V 2.



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1959

PHOTOFACT* Folder
with CIRCUITRACE*

HARMAN-KARDON
MODEL A-10 (Allegro)

HARMAN-KARDON
MODEL A-10 (Allegro)

HARMAN-KARDON
MODEL A-10 (Allegro)

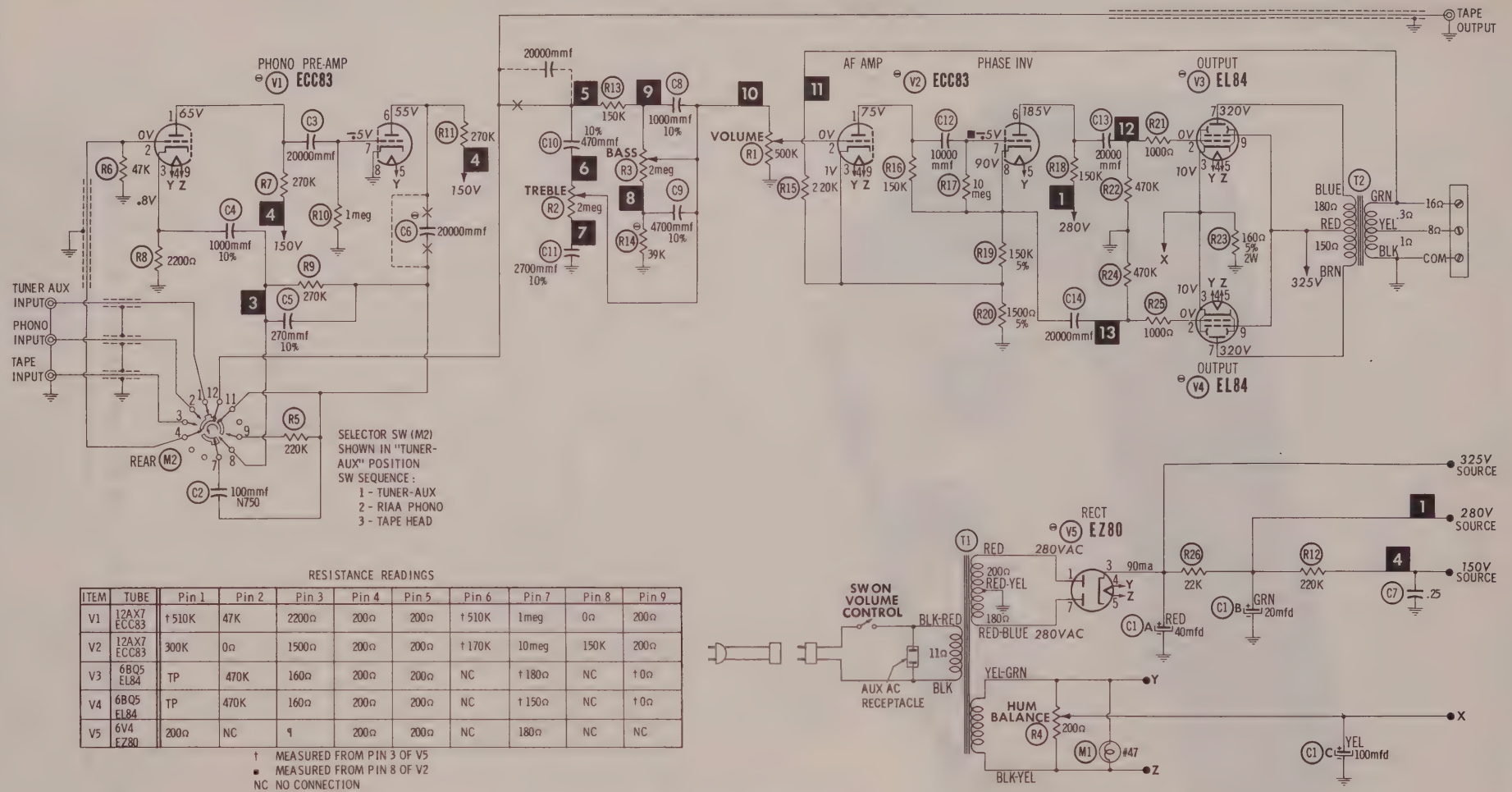
TRADE NAME	Harman-Kardon Model A-10 (Allegro)
MANUFACTURER	Harman-Kardon, Inc., 520 Main St., Westbury, L. I., N. Y.
TYPE SET	AC Operated 3 Channel Audio Amplifier
TUBES (Five)	Types ECC83/12AX7 Phono Preamplifier, ECC83/12AX7 AF Amp.-Phase Inv., (2) EL84/6BQ5 Output, EZ80/6V4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING .60 Amp. @ 117 Volts AC (62 Watts)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H734

SET 426 FOLDER 10



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7 ECC83	†510K	47K	2200Ω	200Ω	200Ω	†510K	1meg	0Ω	200Ω
V2	12AX7 ECC83	300K	0Ω	1500Ω	200Ω	200Ω	†170K	10meg	150K	200Ω
V3	6BQ5 EL84	TP	470K	160Ω	200Ω	200Ω	NC	†180Ω	NC	†0Ω
V4	6BQ5 EL84	TP	470K	160Ω	200Ω	200Ω	NC	†150Ω	NC	†0Ω
V5	6V4 EZ80	200Ω	NC	¶	200Ω	200Ω	NC	180Ω	NC	NC

† MEASURED FROM PIN 3 OF V5
■ MEASURED FROM PIN 8 OF V2
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

©Howard W. Sams & Co., Inc. 1959

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	Phono Preamplifier	ECC83/12AX7 ①
V2	AF Amp. Phase Inv.	ECC83/12AX7 ①
V3	Output	EL84/6BQ5 ①
V4	Output	EL84/6BQ5 ①
V5	Rectifier	EZ80/6V4 ①

① Domestic type listed may not be directly interchangeable in some instances.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	Harman-Kardon PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	375	JE2022515						R2712 *
B	20	325							
C	100	25							

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	Harman-Kardon PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	100			N750-D1100	DTN-100	C10T1U	NT-531	5TCU-T1	N750
C3	20000			BPD-02	DD-203	BYB6S2		5HK-S2	
C4	1000					1R5D1	MCB255	MS-21	10%
C5	270				D6-271	5R5T27		MS-327	10%
C6	20000			BPD-02	DD-203	BYB6S2		5HK-S2	①
C7	.25	200		P288N-25		CUB2P25	GEM-2025	2TM-P25	
C8	1000					1R5D1	MCB255	MS-21	10%
C9	4700					1R5D47		MS-247	10%
C10	470					5R5T47		MS-347	10%
C11	2700					1R5D27		MS-227	10%
C12	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C13	20000			BPD-02	DD-203	BYB6S2		5HK-S2	
C14	20000			BPD-02	DD-203	BYB6S2		5HK-S2	

① Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	Harman-Kardon PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	RV2022500	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	
R2A	2meg	½	RV2022499	B-76	A47-2meg-Z	Q13-139	U55	Treble
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	2meg	½	RV2022499	B-76	A47-2meg-Z	Q13-139	U55	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R4A	200Ω	½	RVC0M2411B	AB-2		B11-201	U1	Hum Adjust
B	Shaft			AK-1		SK2	Not Req.	

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

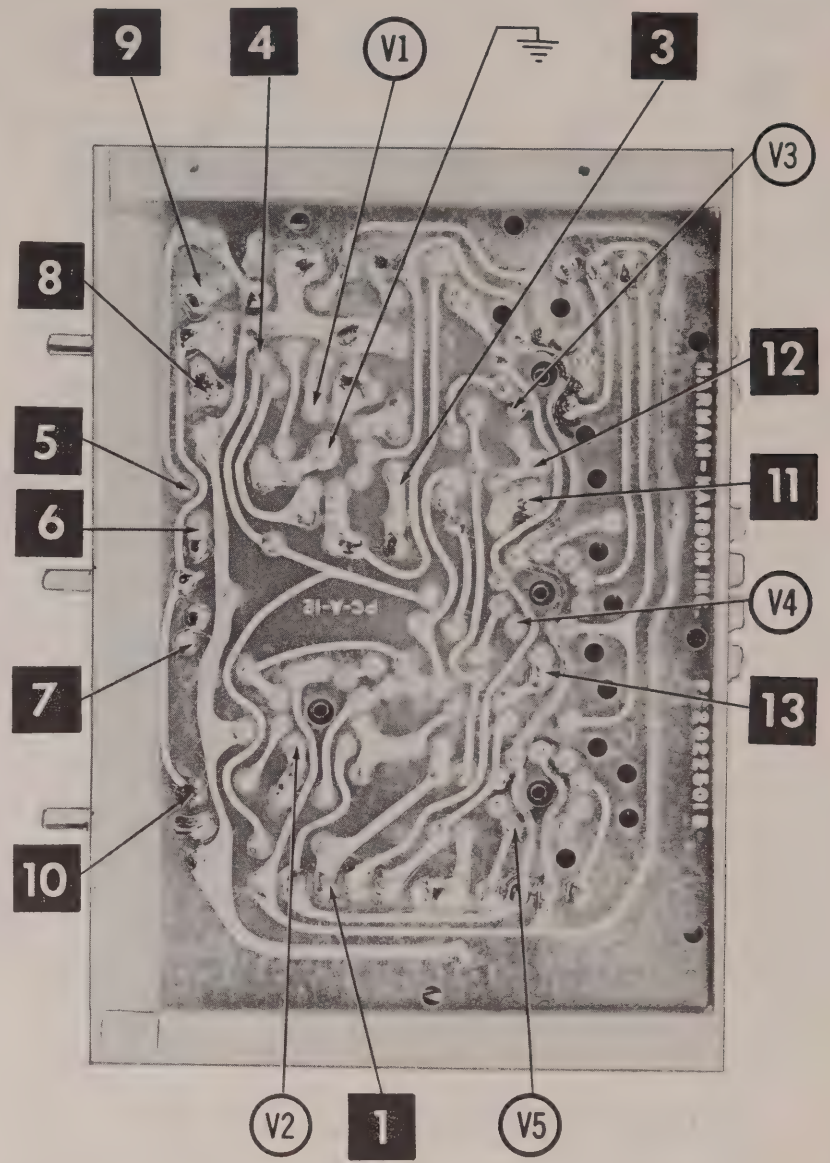
ITEM No.	RATING OHMS	RATING WATT	Harman-Kardon PART No.	NOTES
R5	220K			
R6	47K			
R7	270K			
R8	2200Ω			
R9	270K			
R10	1meg			
R11	270K			
R12	220K			
R13	150K			
R14	39K			Note①
R15	220K			
R16	150K			
R17	10meg			
R18	150K			
R19	150K 5%			
R20	1500Ω 5%			
R21	1000Ω			
R22	470K			
R23	160Ω 5%	2		
R24	470K			
R25	1000Ω			
R26	22K			

Note ① Some versions may use 27K in this application.

PRINTED BOARD

A Howard W. Sams CIRCUITRACE* Photo

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



HARMAN-KARDON
MODEL A-10 (Allegro)

FOLDER 10

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .60A	560VCT @ .090A	6.3V 2.7A	FT2022497		P-3048①				

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5300Ω CT	16Ω Tap @ 8Ω	FT2022498	Z1402	A-2904	AU-600	A-3852	26S46	S-55Z	

MISCELLANEOUS

ITEM No.	PART NAME	Harman-Kardon PART No.	NOTES
M1	Lamp		#47
M2	Switch	ER20222594	Input Selector, Rotary, Wafer Type (Alternate Part #RV2022496)
	Printed Board	PC2022501B	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

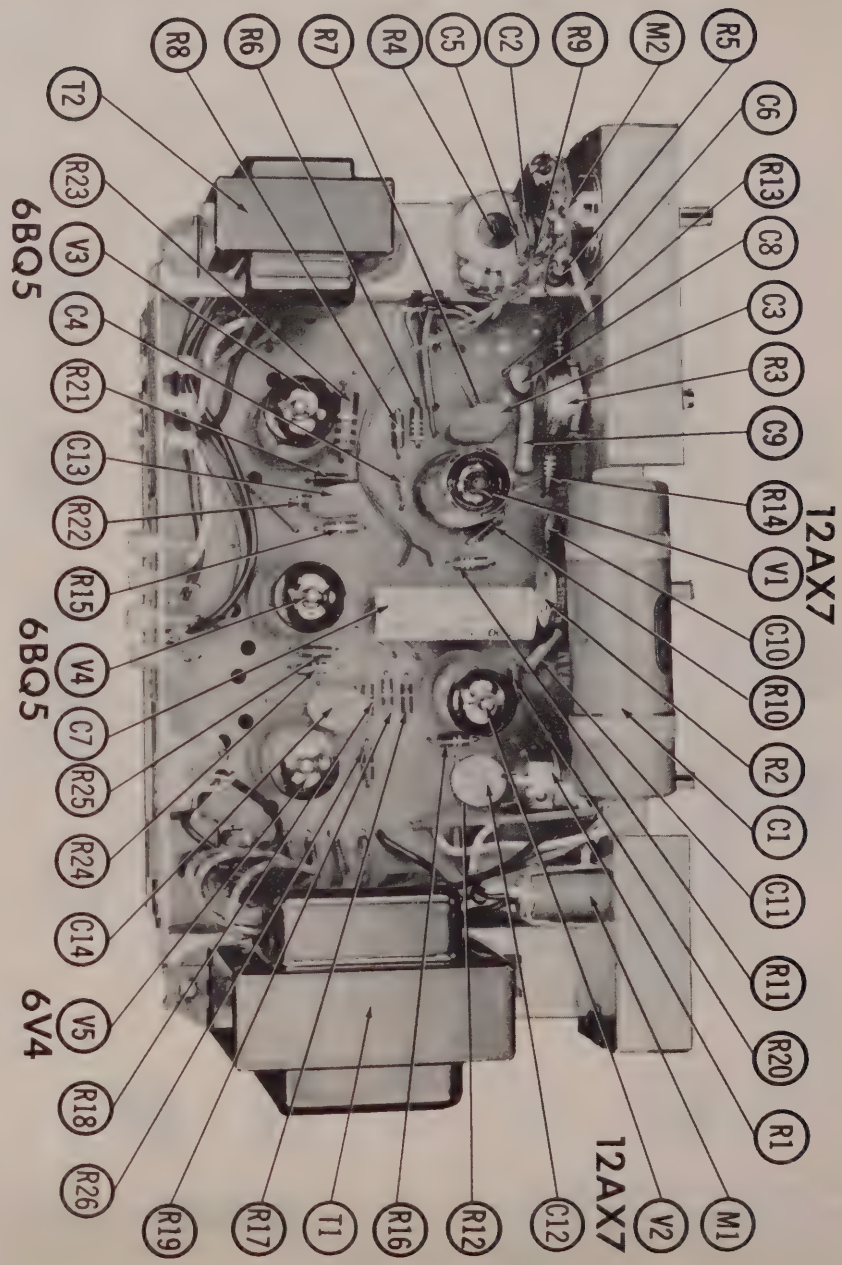
NAME	PART NO.	DESCRIPTION
Knob	P20778	Large
Knob	P22783	3 Used
Cage	P2022491	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874

CHASSIS—TOP VIEW



PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

LEAK MODEL "Point-one Plus"

LEAK MODEL "Point-one Plus"

LEAK MODEL "Point-one Plus"

TRADE NAME	Leak Model "Point-One Plus"
IMPORTER	British Industries Corp., 80 Shore Road, Port Washington, N. Y.
TYPE SET	Externally Powered Preamplifier
TUBES (Two)	Types EF86/6267 (Or) Z729 Preamplifier, EF86/6267 (Or) Z729 Preamplifier

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H754

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	Preamplifier	EF86/6267 ①

ITEM No.	USE	TYPE
V2	Preamplifier	EF86/6267 ①

① Alternate type Z729.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	LEAK PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	8	350		PRS350V8	BR835	TC61	TD-8-350	MT-3508	TVA-1603
C2	50	12		SRE12V50	BBR50-25	TC29	TD-50-25	MQ-0150	TE-1160
C3	50	12		SRE12V50	BBR50-25	TC29	TD-50-25	MQ-0150	TE-1160

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

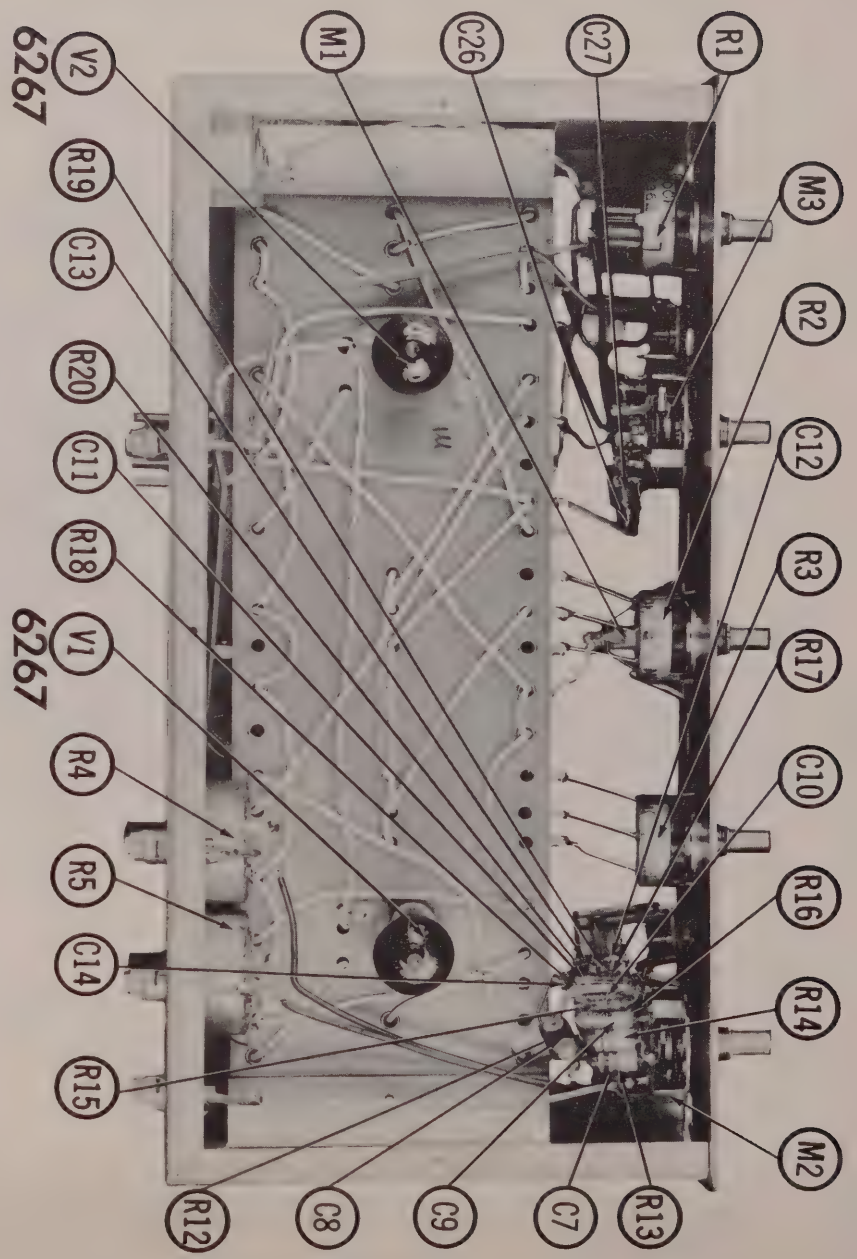
ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	LEAK PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	.1	150		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C5	.1	250		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C6	.1	250		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C7	15			1468-000015	D6-150	5W5Q15		1FM-415	
C8	250			1468-00025	D6-251	5W5T25	MC240	1FM-325	
C9	100			1468-0001	D6-101	5W5T1	MC235	1FM-31	
C10	100			1468-0001	D6-101	5W5T1	MC235	1FM-31	
C11	50			1468-00005	D6-500	5W5Q5	MC225	1FM-45	
C12	150			1468-00015	D6-151	5W5T15	MC236	1FM-315	
C13	50			1468-00005	D6-500	5W5Q5	MC225	1FM-45	
C14	125								
C15	.1	250		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C16	1000			1467-001	D6-102	1W5D1	MC255	1FM-21	
C17	1000			1467-001	D6-102	1W5D1	MC255	1FM-21	
C18	200			1468-0002	D6-201	5W5T2	MC237	1FM-32	
C19	200			1468-0002	D6-201	5W5T2	MC237	1FM-32	
C20	300			1468-0003	D6-301	5W5T3	MC241	1FM-33	
C21	10000			SI10000	D6-103	LT6S1	DC511	5HK-S1	
C22	.25	250		P488N-25		CUB4P25	GEM-4025	4TM-P25	
C23	500			1468-0005	D6-501	5W5T5	MC245	1FM-35	
C24	500			1468-0005	D6-501	5W5T5	MC245	1FM-35	
C25	1000			1467-001	D6-102	1W5D1	MC255	1FM-21	
C26	6500								
C27	2500			1467-0025	D6-252	1W5D25		1FM-225	
C28	.25	250		P488N-25		CUB4P25	GEM-4025	4TM-P25	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	LEAK PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	100K	½		B-41	A47-100K-Z	Q13-128	U41	Volume
B	Shaft			Not Req.	RS-2	PQ	Not Req.	
C	Switch			KB-2 or KR-2*	SWE-20	76-2	US-27	
R2A	500K	½		B-59	A47-500K-S	Q11-114	U67	Treble
B	Shaft			Not Req.	RS-2	PQ	Not Req.	
R3A	5meg	½		B-87	A47-5meg-S	Q11-141	U67	Bass
B	Shaft			Not Req.	RS-2	PQ	Not Req.	
R4	100K	½						Pickup
R5	250K	½						Tuner

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	LEAK PART No.	NOTES
R6	120K			
R7	10K			
R8	2.2meg			
R9	4700Ω			
R10	330K			
R11	2.2meg			
R12	1.8meg			
R13	50meg	1		
R14	50meg	1		
R15	1.8meg			
R16	50meg	.1		
R17	2.2meg			
R18	50meg	1		
R19	50meg	1		
R20	1.8meg			
R21	50meg	1		
R22	470K			
R23	4.7meg			
R24	50meg	1		

ITEM No.	RATING OHMS	RATING WATT	LEAK PART No.	NOTES
R25	50meg	1		
R26	4.7meg			
R27	330K			
R28	330K			
R29	330K			
R30	2.2meg			
R31	2.2meg			
R32	10K			
R33	220K			
R34	4700Ω			
R35	47K			
R36	20K			
R37	20K			
R38	10K			
R39	2.2meg			
R40	2.2meg			
R41	2.2meg			
R42	100K			

MISCELLANEOUS

ITEM No.	PART NAME	LEAK PART No.	NOTES
M1	Lamp		6-8V
M2	Switch		Input Selector, Rotary, Wafer Type
M3	Switch		Filter, Rotary, Wafer Type

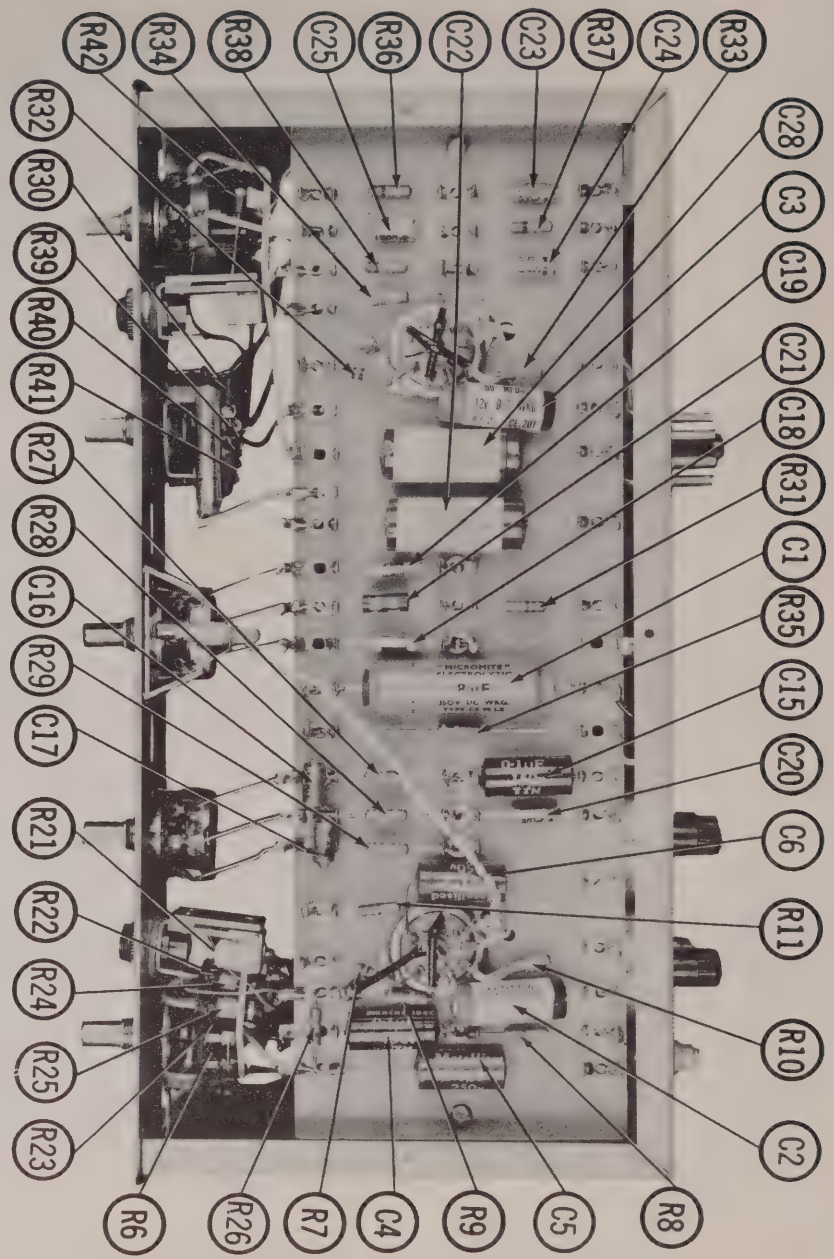
CABINETS & CABINET PARTS

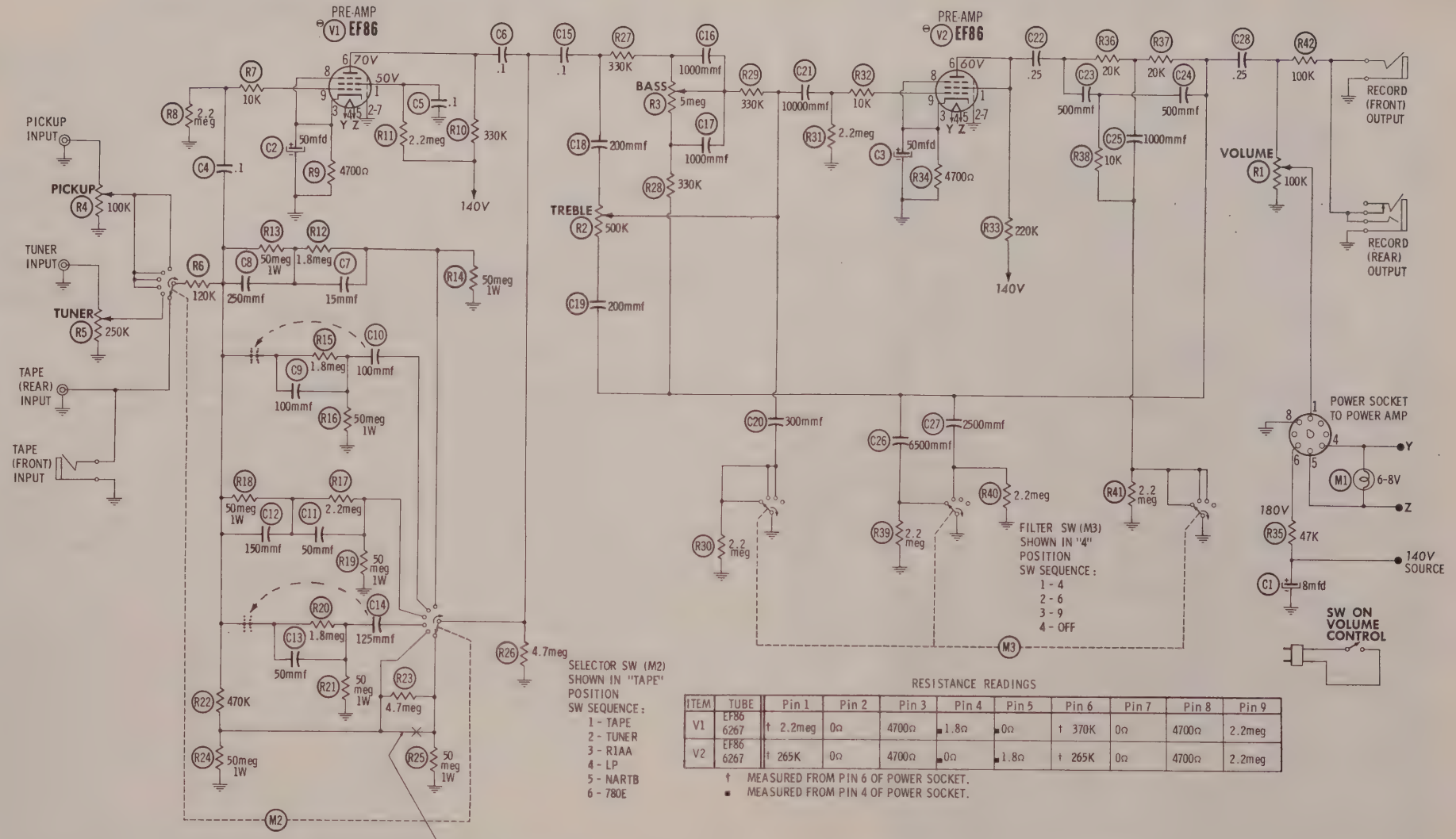
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	EF86 6267	† 2.2meg	0Ω	4700Ω	▪1.8Ω	▪0Ω	† 370K	0Ω	4700Ω	2.2meg
V2	EF86 6267	† 265K	0Ω	4700Ω	▪0Ω	▪1.8Ω	† 265K	0Ω	4700Ω	2.2meg

† MEASURED FROM PIN 6 OF POWER SOCKET.
▪ MEASURED FROM PIN 4 OF POWER SOCKET.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

TO INCREASE THE SENSITIVITY OF THE TAPE REPLAY INPUT FOR MIC OPERATION, CUT WHITE WIRE ON INPUT SWITCH

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

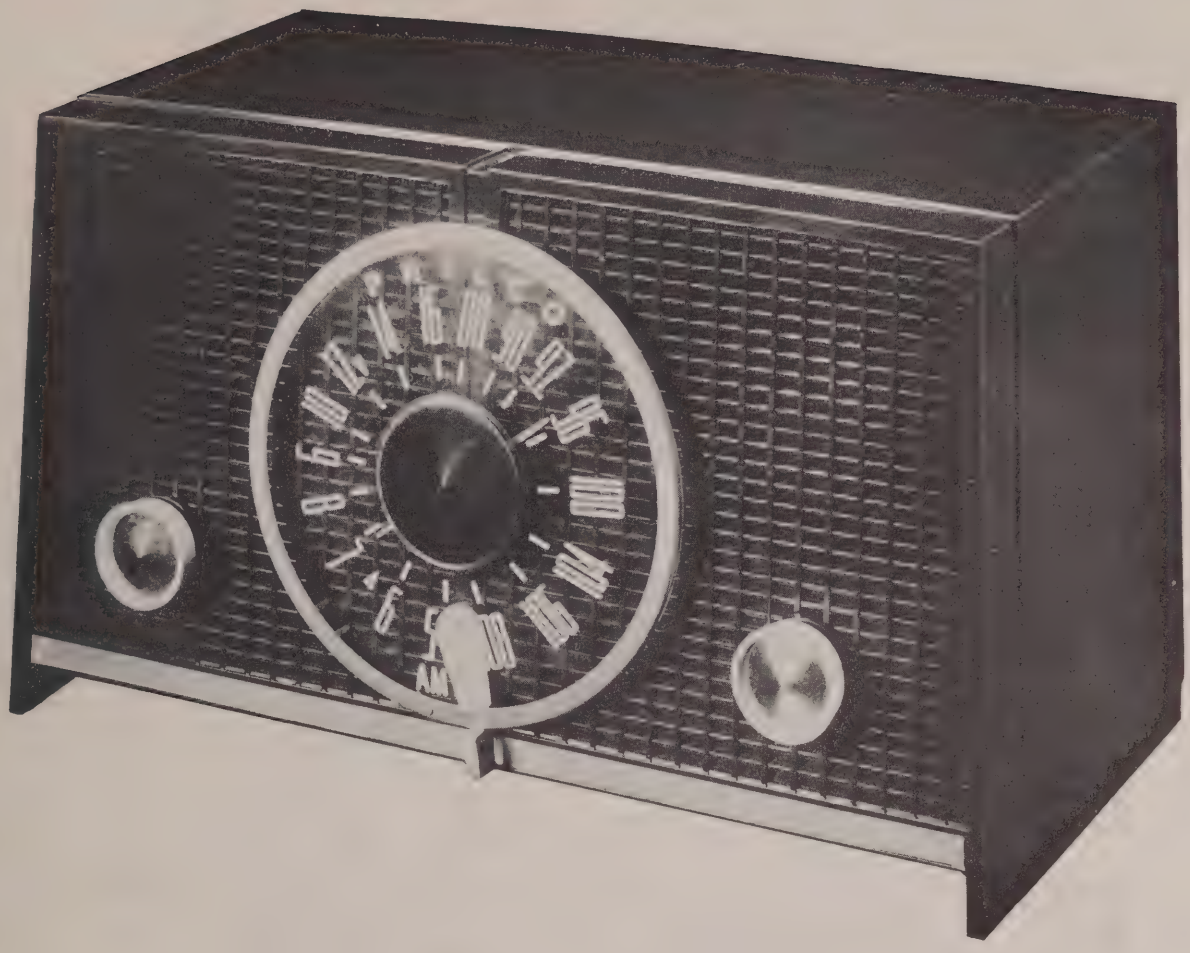
© Howard W. Sams & Co., Inc. 1959

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PHILCO
MODEL F-974

PHILCO
MODEL F-974



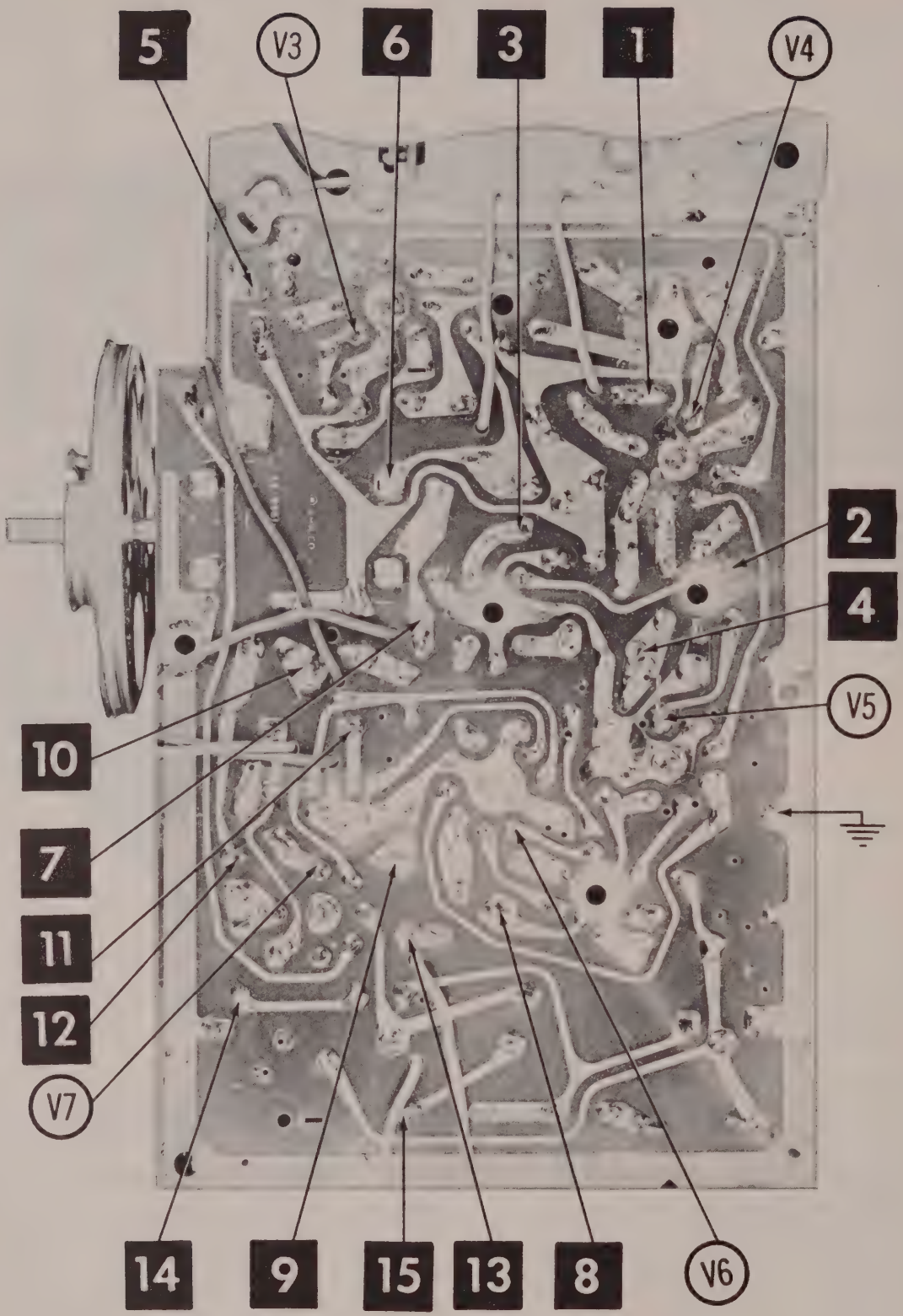
PHILCO
MODEL F-974

TRADE NAME	Philco Model F-974		
MANUFACTURER	Philco Corp., Tioga & "C" Streets, Philadelphia, Pa.		
TYPE SET	AC-DC Operated FM-AM Receiver		
TUBES (Seven)	Types 12AT7 FM RF Amp. - FM Conv., 12BA6 1st FM IF Amplifier, 12BE6 AM Converter, 12BA6 2nd FM-1st AM IF Amp., 12AU6 FM Limiter, 19T8 Disc. - AM Det. - AVC - AF Amp., 35C5 Output		
POWER SUPPLY	105-120 Volts AC-DC	RATING	.34 Amp. @ 117 Volts AC (31 Watts)
TUNING RANGE - BROADCAST	540 - 1620KC	FREQ. MOD.	88 - 108MC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

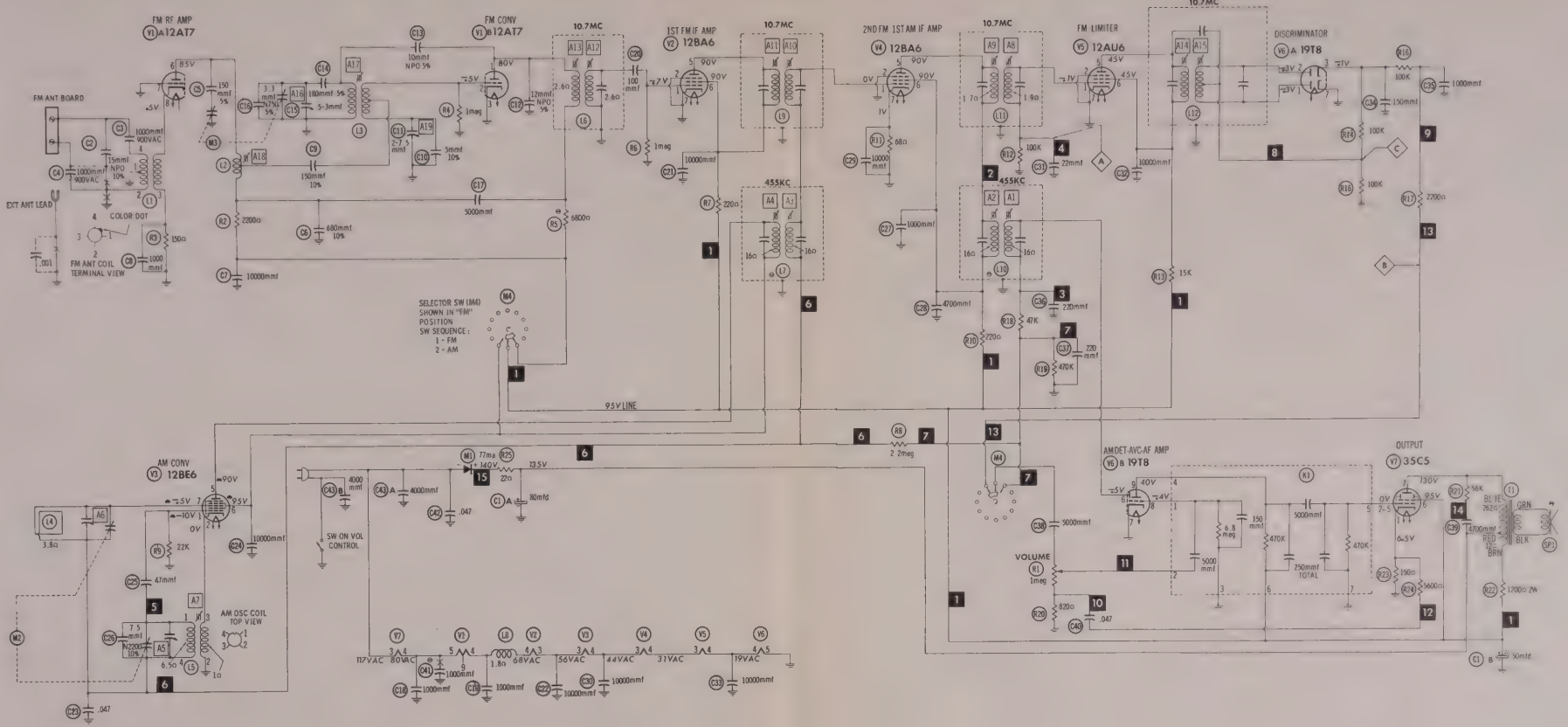
H741



A Howard W. Sams CIRCUITRACE* Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AT7	†8000Ω	1meg	0Ω	67Ω	79Ω	†3400Ω	0Ω	150Ω	68Ω
V2	12BA6	1meg	0Ω	55Ω	67Ω	†1400Ω	†1400Ω	0Ω		
V3	12BE6	▲22K	▲1Ω	95Ω	43Ω	†▲1200Ω	†▲1200Ω	▲2.7meg		
V4	12BA6	2.7meg	0Ω	43Ω	31Ω	†1400Ω	†1400Ω	68Ω		
V5	12AU6	100K	0Ω	31Ω	19Ω	†16K	†16K	0Ω		
V6	19T8	100K	100K	200K	19Ω	0Ω	510K	0Ω	6.8meg	†470K
V7	35C5	150Ω	470K	110Ω	79Ω	470K	†1200Ω	†234Ω		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
† MEASURED FROM OUTPUT OF M1.
▲ MEASURED IN "AM" POSITION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

© Howard W. Sams & Co., Inc. 1959

426-12

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05mfd	High side to pin 7 (grid) of 12BE6 (V3). Low side to B-.	455KC (400~ Mod.)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1600KC	"	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	"	Tune to 1400KC signal	"	A6	"
4.		"	600KC	"	600KC	"	A7	Adjust for maximum output while rocking tuning gang. Repeat steps 2, 3 and 4.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	200mmf	High side to junction of L1 and R3. Low side to B-.	10.7MC (Unmod.)	FM	Point of non-interference	DC probe thru 100K to point (A). Common to B-.	A8, A9, A10, A11 A12, A13	Adjust for maximum output.
6.	"	"	"	"	"	DC probe thru 100K to point (B). Common to B-.	A14	"
7.	"	"	"	"	"	DC probe thru 100K to point B. Common to point (C).	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	200mmf	High side to junction of L1 and R3. Low side to B-.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. thru 100K to point (A). Low side to B-.	A8, A9, A10, A11 A12, A13	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
6.	"	"	"	"	"	Vert. Amp. thru 100K to point (B). Low side to B-.	A14	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
7.	"	"	"	"	"	Vert. Amp. thru 100K to point (C). Common to B-.	A15	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A14 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
8.	270Ω Carbon Resistor	Across FM antenna terminals.	108.5MC (Unmod.)	FM	Insert a .006" non-metallic shim between rotor & stator. Close gang on shim.	DC probe thru 100K to point (B). Common to point (C).	A16	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
9.	"	"	87.75MC	"	Tuning gang fully closed	"	A17	"
10.	"	"	91MC	"	91MC	DC probe to point (A). Common to B-.	A18	Adjust for maximum deflection.

A19 is a factory adjustment to minimize oscillation radiation and should require adjustment only if C11 is replaced.
If necessary, tune receiver to 100MC and adjust A19 for minimum indication on a field strength meter tuned to the oscillator frequency.

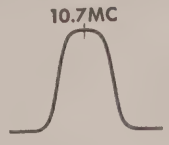
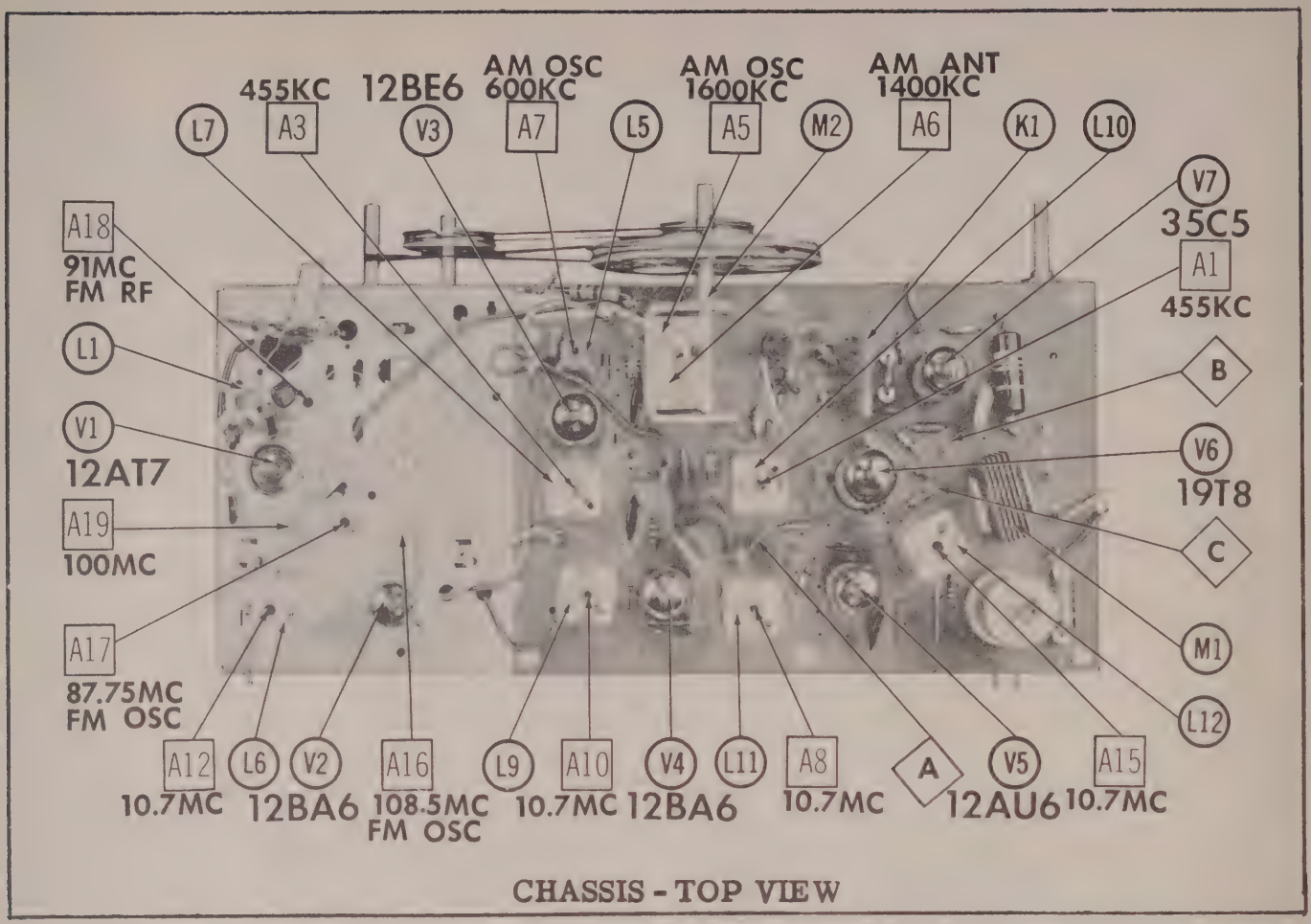
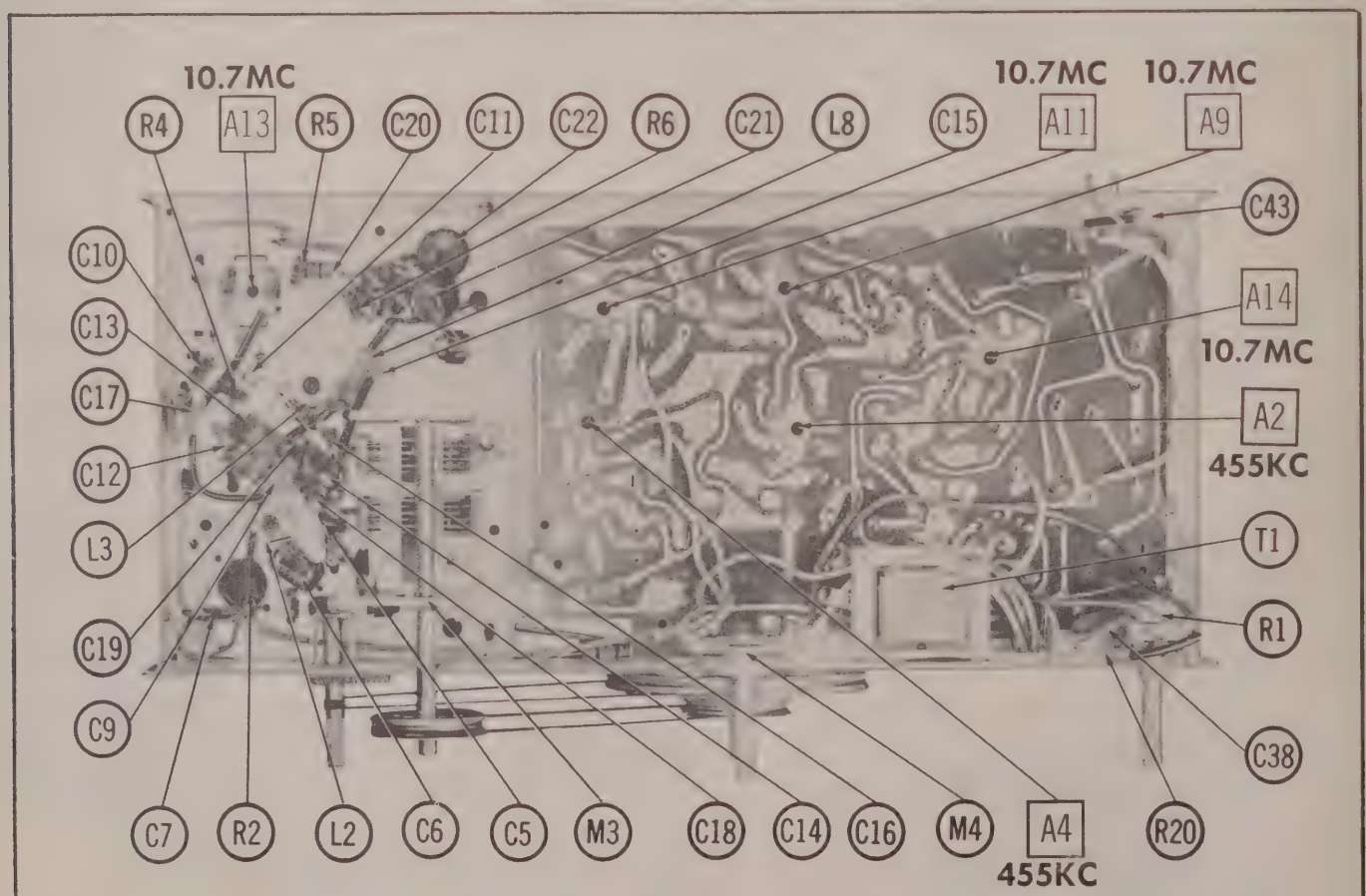


FIG. 1

FIG. 2



CHASSIS - TOP VIEW



CHASSIS - BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amp. - FM Conv.	12AT7	
V2	1st FM IF Amplifier	12BA6	
V3	AM Converter	12BE6	
V4	2nd FM-1st AM IF Amp.	12BA6	
V5	FM Limiter	12AU6	
V6	Discriminator - AM Det. - AVC - AF Amplifier	19T8	
V7	Output	35C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	80	150	30-2585-9	AFH2-19-05	BBRD8515		TDLD-12	FMD-303	R277 *
B	▲50	150							

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

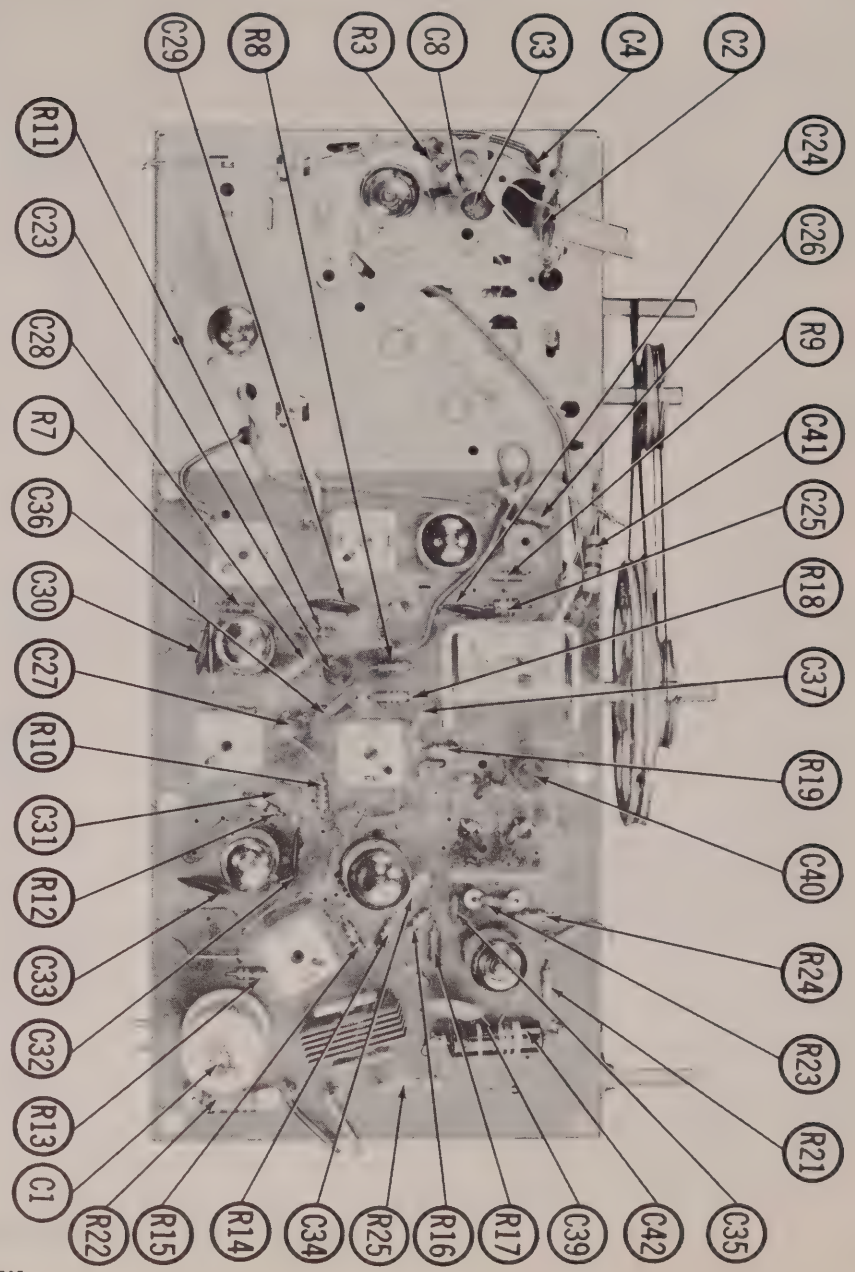
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	15		62-015409011	NPO-SI 15	DTZ-15	CTA6Q15C		5TCC-Q15	NPO 10%
C3	1000	900VAC	30-1267-4						
C4	1000	900VAC	30-1267-4						
C5	150		30-1257-13	1469-00015	TCZ-150	22R5T15	MCE236	MS-315	5%
C6	680		60-10685411	1469-00068	MD-681	1R5T68		MS-368	10%
C7	10000		30-1238-2	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C8	1000		62-210001011	SI 1000	D6-102	LT6D1	UC-521	5HK-D1	
C9	150		30-1257-13	1469-00015	DD-151	22R5T15	MCB236	MS-315	10%
C10	5		30-1257-14	1469-000005	DD-050	22R5V5	MCB205	MS-55	10%
C11	2-7.5		31-6520-22						
C12	12		62-012300001		TCZ-12				NPO 5%
C13	10		62-010409001		TCZ-10				NPO 5%
C14	180		30-1257-8	1469-00018	TCZ-180	22R5T18		MS-318	5%
C15	.5-3		31-6520-18		829-3		CT565A		
C16	3.3		30-1224-114		TCN-3R3				N750 5%
C17	5000		30-1238-1	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C18	1000		30-1267-4	SI 1000	D6-102	LT6D1	UC-521	5HK-D1	
C19	1000		62-210001011	SI 1000	D6-102	LT6D1	UC-521	5HK-D1	
C20	100		62-110009001	SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C21	10000		30-1238-2	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C22	10000		30-1238-2	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C23	.047	200	30-4685-28	P288N-047	DF-503	BC6S47J	ACE6147	2SE-S47	
C24	10000		30-1262	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C25	47		30-1230-4	SI 47	D6-470	LT6Q47	UC-5447	5GA-Q47	
C26	7.5		30-1224-83						N2200 10%
C27	1000		30-1262-12	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C28	4700		30-1262-3	BPD-0047	DD-472	BYA10D47M	UC-5247	5HK-D47	
C29	10000		30-1262	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C30	10000		30-1262	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C31	22		30-1263-19	BPD-000022	DD-220	L10Q22	UC-5422	5GA-Q22	
C32	10000		30-1262	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C33	10000		30-1262	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C34	150		30-1262-24	BPD-00015	DD-151	L10T15	UC-5315	5GA-T15	
C35	1000		30-1262-12	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C36	220		30-1262-23	BPD-00022	DD-221	L10T22	UC-5322	5GA-T22	
C37	220		30-1262-23	BPD-00022	DD-221	L10T22	UC-5322	5GA-T22	
C38	5000		30-1238-1	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C39	4700		30-1262-3	BPD-0047	DD-472	BYA10D47M	UC-5247	5HK-D47	
C40	.047	200	30-4685-45	P288N-047	DF-503	BC6S47J	ACE6147	2SE-S47	
C41	1000		62-210001011	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	①
C42	.047	400	30-4650-45	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C43A	4000		30-1266-1	BPD-2X004	DD-402	BYC6DD4	DCD524	5HK-2D4	
B	4000				DD-402				

① Not used in some versions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A B C	1meg Shaft Switch	½	33-5588-9	B-70 Not Req. KB-1 or KR-1*	A47-1meg-Z FS-3 SWE-12	Q13-133 Not Req. 76-1	U53 Not Req. US-26	Volume

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R2	2200Ω		66-2228340	
R3	150Ω		66-1158340	
R4	1meg		66-5108340	
R5	6800Ω		66-2688340	Note 1
R6	1meg		66-5108340	
R7	220Ω		66-1228340	
R8	2.2meg		66-5228340	
R9	22K		66-3228340	
R10	220Ω		66-1228340	
R11	68Ω		66-0688340	
R12	100K		66-4108340	
R13	15K		66-3158340	
R14	100K		66-4108340	
R15	100K		66-4108340	
R16	100K		66-4108340	
R17	2200Ω		66-2228340	
R18	47K		66-3478340	
R19	470K		66-4478340	
R20	820Ω		66-1828340	
R21	56K		66-3568340	
R22	1200Ω	2	66-2125340	
R23	150Ω		66-1158340	
R24	5600Ω		66-2568340	
R25	22Ω		33-1334-21	

Note 1. Some versions may use 5600Ω in this application (Part #66-2568340).

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		PHILCO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Ant. Trans.	32-4718-1					
L2	FM RF Coil	32-4717-1					
L3	FM Osc. Coil	32-4716-1					
L4	Loop Antenna	76-11304					
L5	AM Osc. Coil	32-4693-8					
L6	1st FM IF	32-4715-1					
L7	1st AM IF	32-4583-14 ①					
L8	Fil. Choke	32-4422-8					2.2 Microhenries ②
L9	2nd FM IF	32-4712-1					
L10	2nd AM IF	32-4583-15 ①					
L11	3rd FM IF	32-4712-2					
L12	Discriminator	32-4714-2	17-3491				

① Alternate Part #32-4583-17. ② IRC Part #CLA.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	PHILCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3300Ω Tap @ 16Ω	3-4Ω	32-8784-1	Z1105	A-3031		A-3336	24S50A	S-16X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	PHILCO PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	36-1669-6 ①	52A21	① Alternate Part #45-9733

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	PHILCO PART No.	REPLACEMENT DATA
K1	Audio Circuit	150mmf, 250mmf, 5000mmf, 5000mmf, 470K, 470K, 6.8meg	30-6027	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	PHILCO PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.077A	34-8040-4	1235AH	RS100	100S ①	① Silicon Type

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M2	Tuning Cap.	31-2783-7	AM, 2 Gang
M3	Tuning Cap.	37-2789-2	FM, 2 Gang
M4	Switch	42-2058-3	AM-FM, Rotary, Wafer Type
	Printed Board	54-9961-3	

CABINETS & CABINET PARTS

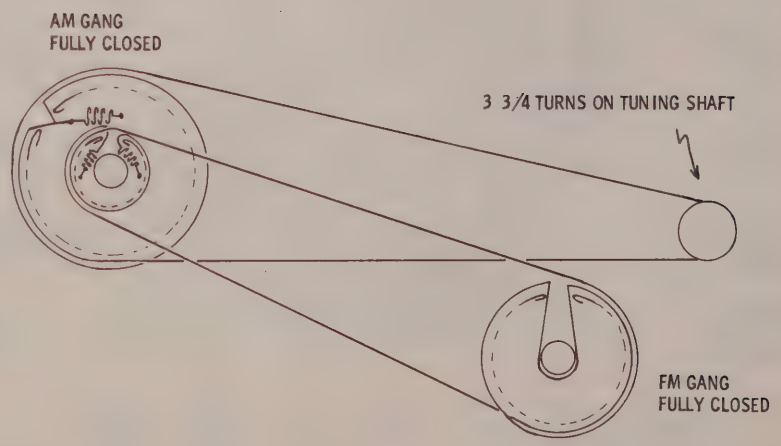
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	54-6093-16	On-Off-Volume, Tuning; Ebony
Knob	54-6093-21	On-Off-Volume, Tuning; Maroon
Knob	54-6456-1	AM-FM; Ebony
Knob	54-6456-2	AM-FM; Maroon
Cabinet	11294	Ebony
Cabinet	11294-1	Maroon
Cabinet	76-10263-1	Back, Includes L4

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874



DIAL CORD STRINGING

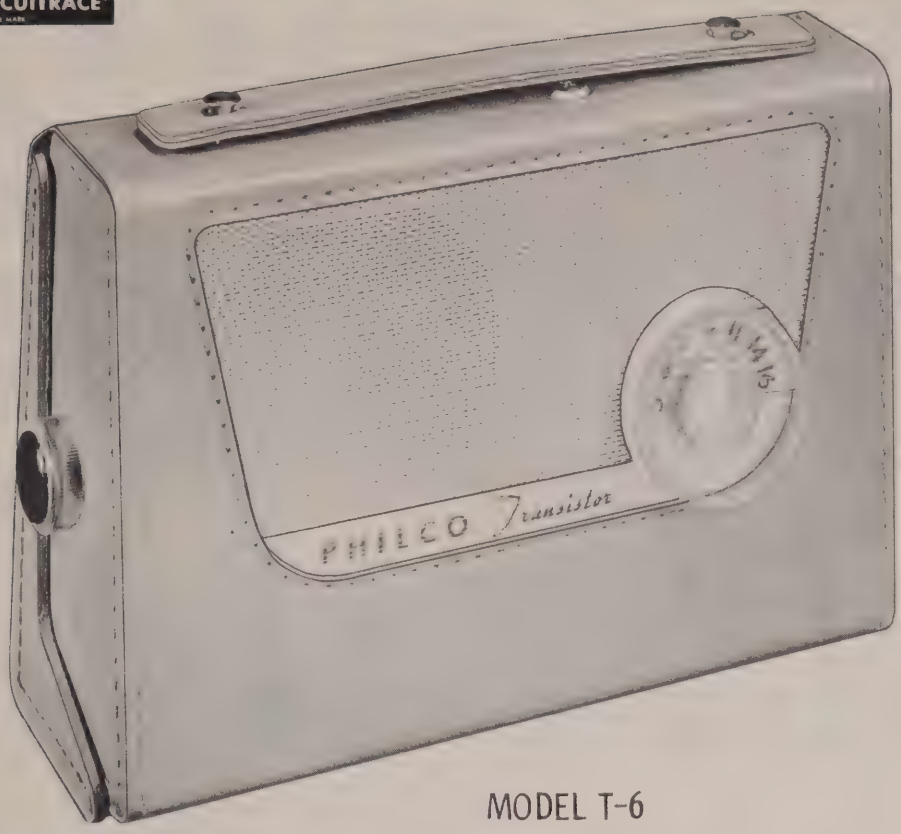
PHOTOFACT* Folder

with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PHILCO
MODELS T-6, T-600

PHILCO
MODELS T-6, T-600



MODEL T-6

PHILCO
MODELS T-6, T-600

TRADE NAME	Philco Models T-6, T-600 (Code 124)
MANUFACTURER	Philco Corp. Tioga & "C" Streets, Philadelphia, Pa.
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	3 Volts DC
TUNING RANGE—BROADCAST	535-1620KC
RATING	9.2MA @ 3Volts DC (No Signal, Min. Volume) 32MA @ 3 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

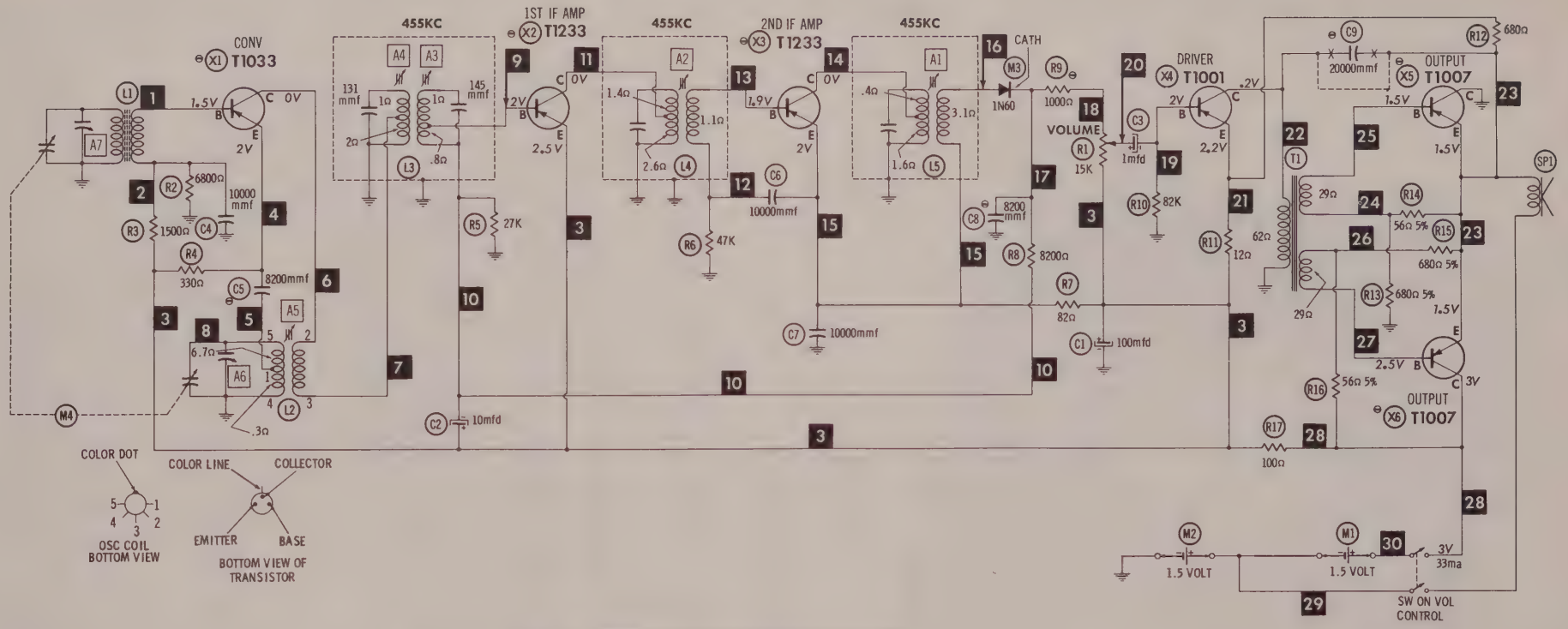
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to Antenna stator lug of tuning gang. Low side to B-.	455KC (400~ Mod.)	Tuning Gang fully open	Across voice coil	A1, A2 A3, A4	Adjust for maximum output
2.		Loop	600KC	600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang.
3.		"	1620KC	Tuning gang fully open	"	A6	"
4.		"	1400KC	Tune to 1400KC signal	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang. Repeat Steps 2 thru 4.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H765

SET 426 FOLDER 13



RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal apllied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE®

©Howard W. Sams & Co., Inc. 1959

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	T-1033	Converter			2N486		PNP
X2	T-1233	1st IF Amplifier			2N483		PNP
X3	T-1233	2nd IF Amplifier			2N483		PNP
X4	T-1001	Driver			2N362		PNP
X5	T-1007	Output			2N359		PNP Note 1
X6	T-1007	Output			2N359		PNP Note 1

Note 1. X5 & X6 are a matched pair.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	100	3	30-2588-2	PWE3100	NL110-3	TT6X100	ML100-3	MQ-380	TE-1060
C2	10	6	30-2591-3	PWE6010	NL10-6	TT6X10	ML10-6		TE-1087
C3	1	6	30-2591-5	PWE6001	NL1-6	TT12X1	ML1-6		TE-1080

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	10000		30-1272-2	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C5	8200								①
C6	10000		30-1272-2	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C7	10000		30-1272-2	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C8	8200								①
C9	20000		30-1238-5	BPD-02	DD-203	BYB6S2		5HK-S2	②

① Some versions may use 8000mmf in this application (Part #30-1262-1).
② Not used in Model T-600.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	15K	½	33-5575-14					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R2	6800Ω		66-2688340	
R3	1500Ω		66-2158340	
R4	330Ω		66-1338340	
R5	27K		66-3278340	
R6	47K		66-3478340	
R7	82Ω		66-0828340	
R8	8200Ω		66-2828340	
R9	1000Ω		66-2108340	

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R10	82K		66-3828340	
R11	12Ω		66-0128340	
R12	680Ω		66-1688340	
R13	680Ω 5%		66-1688240	
R14	56Ω 5%		66-0568240	
R15	680Ω 5%		66-1688240	
R16	56Ω 5%		66-0568240	
R17	100Ω		66-1108340	

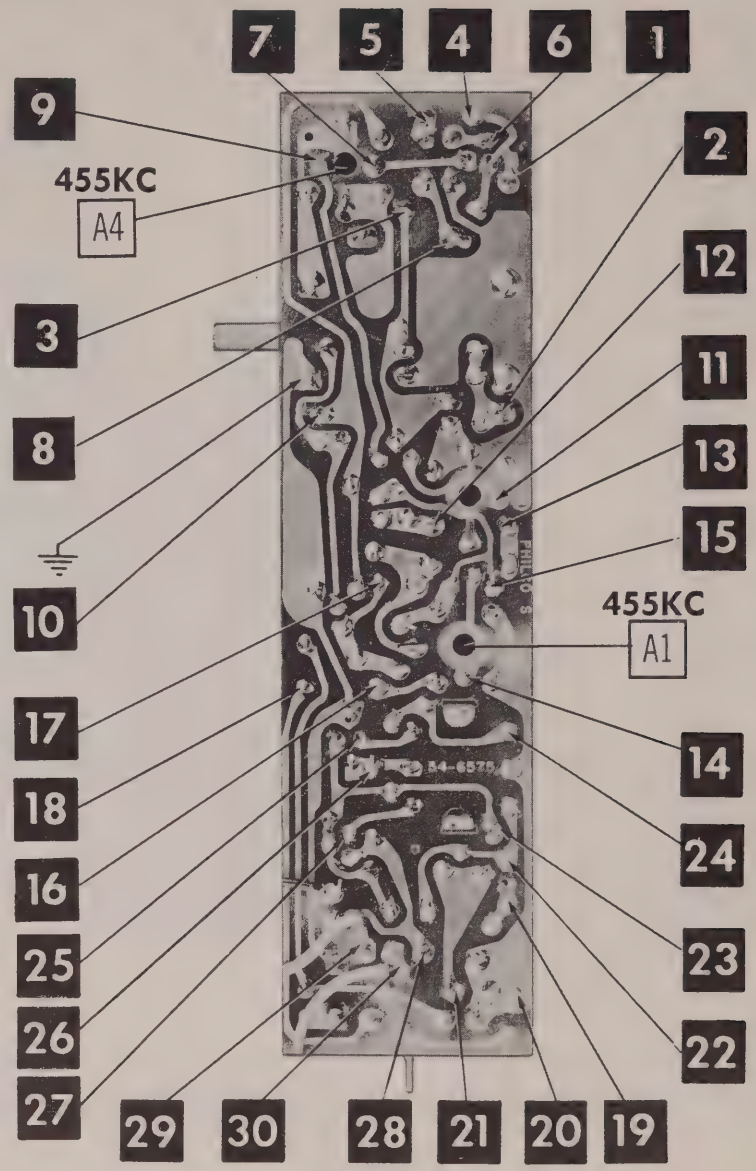
Note 1. Model T-600 uses 330Ω in this application (Part #66-1338340).

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		PHILCO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	32-4668-5					
L2	Osc. Coil	32-4669-2					
L3	1st IF	32-4738-4					
L4	2nd IF	32-4738-5					
L5	3rd IF	32-4738-3					

PRINTED BOARD

A Howard W. Sams CIRCUITRACE* Photo



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC. 1	PHILCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.7	: 1	32-8838-2						
		SEC. 2							
	1.7	: 1							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	PHILCO PART No.	QUAM PART No.	
SP1	3½"	PM	8-10Ω	36-1652-1	3A07Z8.5	

BATTERIES

ITEM No.	VOLTAGE	PHILCO PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V			2R		950		M-13R	
M2	1.5V			2R		950		M-13R	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		PHILCO PART No.	CBS PART No.	SYLVANIA PART No.	
M3	1N60	324-0006-3	1N60	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M4	Tuning Cap. Printed Board	31-2783-12 54-6575	2 Gang

CABINETS & CABINET PARTS

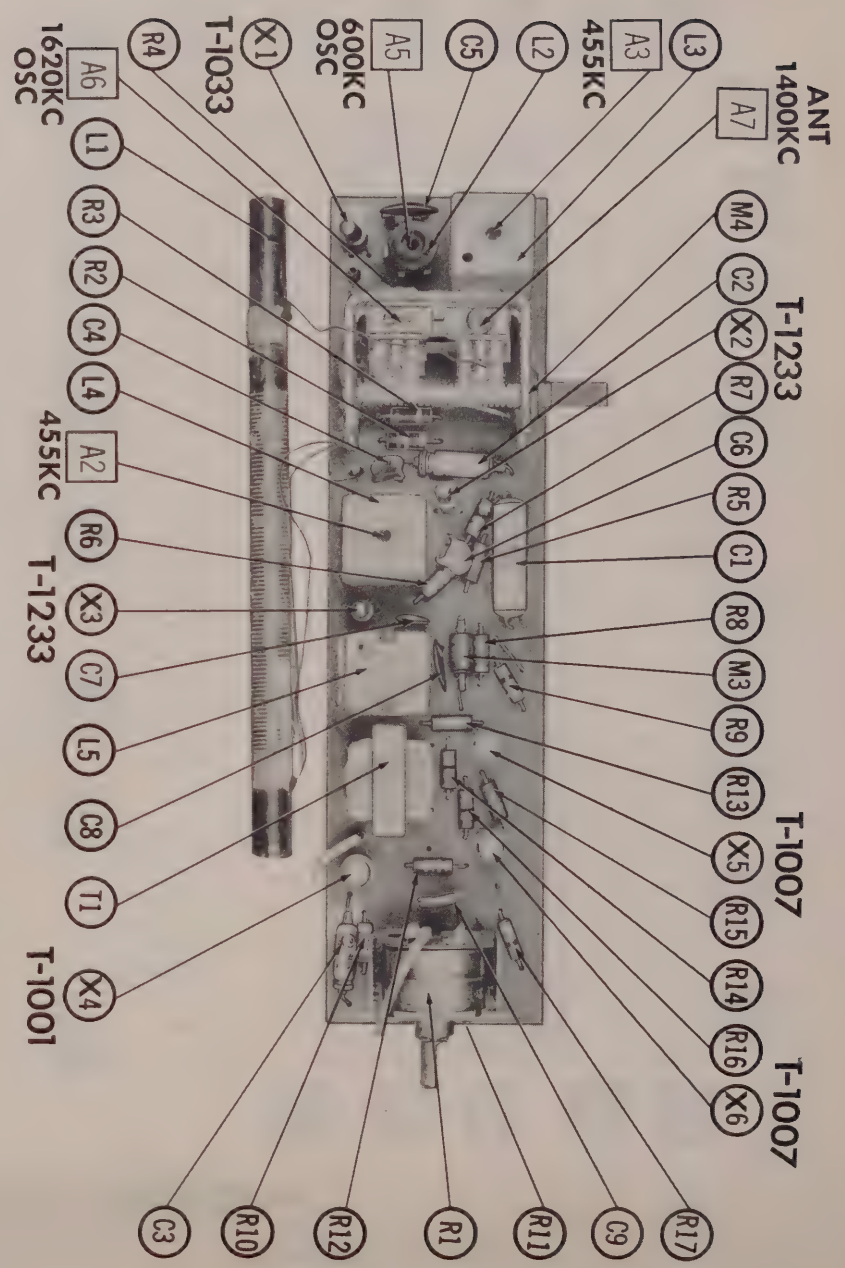
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	54-6624-3	Tuning, Model T-6
Knob	54-6292-5	Tuning, Model T-600
Knob	54-6299-11	On-Off-Volume, Model T-6
Knob	54-6421-1	On-Off-Volume, Model T-600
Handle	54-6205-16	Model T-6
Cabinet	51-0006	Model T-6
Cabinet	424-0031	Model T-600
Cabinet Back	54-6599-1	Model T-600
Dial Scale	54-5383	Includes Nameplate, Model T-6
Dial Plate	28-12260	Model T-600

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS TOP VIEW



PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

STEELMAN MODELS
3S9, 3S9T, 4D19, 4D20, 4D21

STEELMAN MODELS
3S9, 3S9T, 4D19, 4D20, 4D21

MODEL 4D20

STEELMAN MODELS
3S9, 3S9T, 4D19, 4D20, 4D21

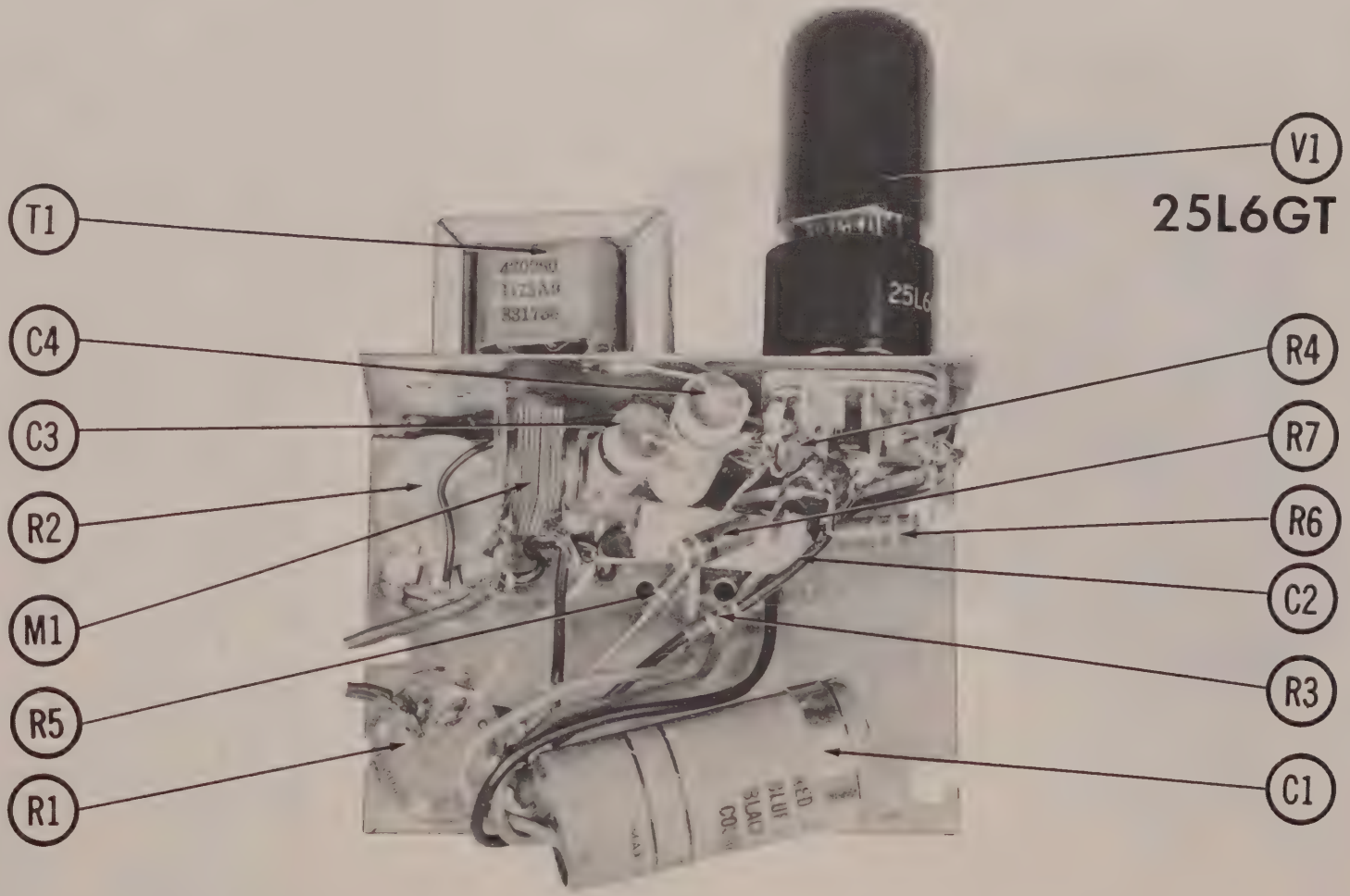
TRADE NAME	Steelman Models 3S9, 3S9T, 4D19, 4D20, 4D21
MANUFACTURER	Steelman Phono & Radio Co., Inc., 12-30 Anderson Ave., Mount Vernon, N. Y.
TYPE SET	AC Operated Phono Amplifier With Manual Record Player
TUBES (One)	Type 25L6GT (Or) 25C5 Output
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .38 Amp. @117 Volts

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H773

SET 426 FOLDER 14



CHASSIS - BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Output	25L6GT	①

ITEM No.	USE	TYPE	NOTES

① Some versions may use type 25C5.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	STEELMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	582005 ①	PRS150V5030	BBRD5315	TCD497	TDLD-8	MTD-301	TVA-2450
B	30	150							

① Models 3S9, 3S9T, 4D20 use Part #582007.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	STEELMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S2	①
C3	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	②
C4	.05	400		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	③

① Not used in model 3S9.
② Some versions may use .05mfd in this application.
③ Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	STEELMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	360081 ①	B-70	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1orKR-1*	SWE-12	76-1	US-26	
R2A	100K	½	360050 ②	B-41	A47-100K-Z	Q13-128	U39	Tone
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.
① Part #360281 used in models 4D19 & 4D21.
② Tone control not used in model 3S9. Part #360250 used in models 4D19 & 4D21.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		STEELMAN PART No.	NOTES
	OHMS	WATT		
R3	33K			Note 1
R4	150Ω			Note 2
R5	220K			

ITEM No.	RATING		STEELMAN PART No.	NOTES
	OHMS	WATT		
R6	330Ω	1		Note 3
R7	47Ω	1		

Note 1. Some versions may use 27K in this application.
Note 2. Some versions may use 100Ω in this application.
Note 3. Some versions may use 4700Ω in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	STEELMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2300Ω	1-2Ω	430260 ①	Z1001	A-2902④	AU-604④	A-3849④	24S64 ④		① Used in models 4D20, 4D21.
	2200Ω	3-4Ω	430330 ②	Z1101	A-3025	AU-605	A-3332	24S53	S-12X	② Used in models 4D19, 3S9.
	2200Ω	3-4Ω	430221 ③	Z1101	A-3025	AU-605	A-3332	24S53	S-12X	③ Used in model 3S9T.
										④ Drill new mounting hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	STEELMAN PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	404003	4A07	
SP2	4"	PM	3-4Ω	404003 ①	4A07	① Used only in Models 4D20 & 4D21.

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	STEELMAN PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.047A	380001	1234AH	T065 SD-92①	65A K200 ①	① Silicon Type

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA						REMARKS
	STEELMAN PART No.	ASTATIC PART No.		JENSEN PART No.			
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE		
M2	322503	420TS *KR-314-T	N8-1 and N8-3	1	† CRA-55 or ♦ CRA-55D † CRA-55LP or ♦ CRA-55LPD	Models 4D20, 4D19, 4D21 * Tone Arm Complete With Cartridge	
	323505	420-TB-TS *K-314-T	N8-1 and N8-3			Model 3S9 * Tone Arm Complete With Cartridge	
	323504	420-TB-TS *KR-314-T	N8-1 and N8-3			Model 3S9T * Tone Arm Complete With Cartridge	

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	STEELMAN PART No.	JENSEN PART No.	WALCO PART No.	
M3	329107 (LP) 329307 (78) 323905	† CRA-55LP or ♦ CRA-55LPD † CRA-55 or ♦ CRA-55D	† W-64MGS or ♦ W-64MGD † W-64S or ♦ W-64D † W-61S or † W-61MGS or † W-61AGS	Models 4D20, 4D19, 4D21 Models 3S9, 3S9T

† Jewel ♦ Diamond

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	STEELMAN PART No.	NOTES
M4	Motor	311042	4 Speed, 90 Volt, General Industries, Model 4D20
	Motor	310041	4 Speed, 90 Volt, Alliance, Models 4D19, 4D21
	Motor	310021	3 Speed, 90 Volt, Alliance, Model 3S9
	Motor	311021	3 Speed, 90 Volt, General Industries, Model 3S9T

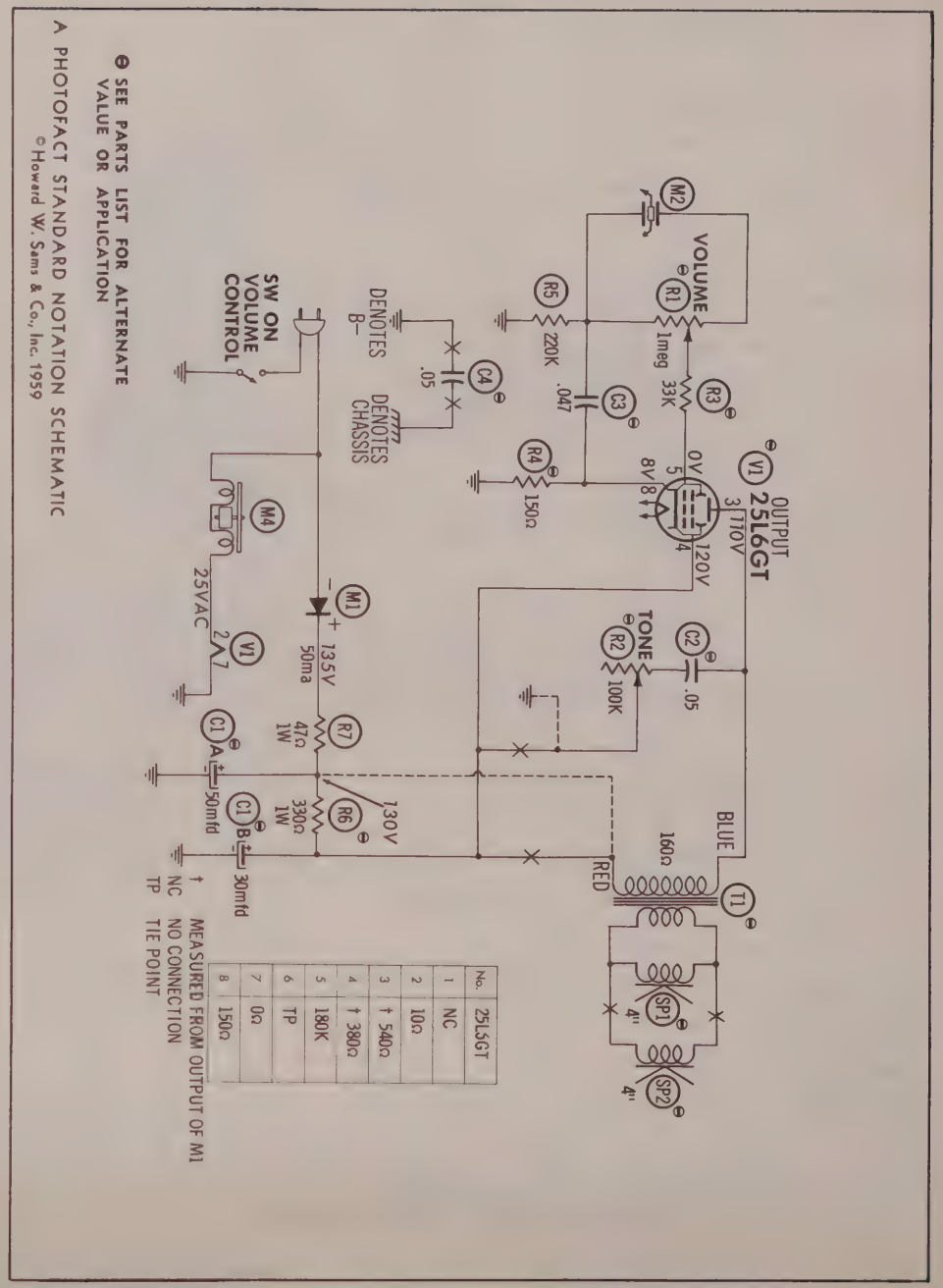
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	272223	2 Used, Model 4D20
Knob	271305	Loudness, Model 4D21
Knob	271306	Tone, Model 4D21
Knob	270146	Loudness, Model 4D19
Knob	270147	Tone, Model 4D19
Knob	270101	2 Used, Model 3S9, 3S9T
Case	200035	Tan, Model 4D20
Case	200036	White, Model 4D20
Case	230970	Grey And Green, Model 4D21
Case	230990	2-Tone Green, Model 4D19
Case	231000	Red And Grey, Model 4D19
Case	230950	Red And White, Model 3S9T
Cabinet	230960	Model 3S9

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

V-M
MODEL 1500

V-M
MODEL 1500

V-M
MODEL 1500

GENERAL INFORMATION

V-M Model 1500 record changers automatically play a stack of 16 2/3- or 45-rpm records and shut off after playing the last record.

The records are separated by an actuator rod inside the spindle. This rod actuates the bolts and separator blades, allowing the bottom record of a stack to drop to the turntable.

A positive position trip mechanism is used in this changer. The trip is actuated and the change cycle started when the tone arm reaches a predetermined distance from the center of the record.

When servicing this changer, connect to a supply of 90 volts, 60 cycles AC only, unless otherwise specified.

MANUFACTURED BY:

V-M Corporation
Benton Harbor, Michigan

This material compiled and published by

HOWARD W. SAMS & CO., INC., INDIANAPOLIS 6, INDIANA

C387

Copyright 1959 • All Rights Reserved

TABLE OF CONTENTS

	Page
General Information	1
Operating Instructions	3
Change Cycle Operation	3
Servicing Instructions	5
Exploded View-Top	6
Exploded View-Bottom	7
Trouble Chart	8
Parts List	11

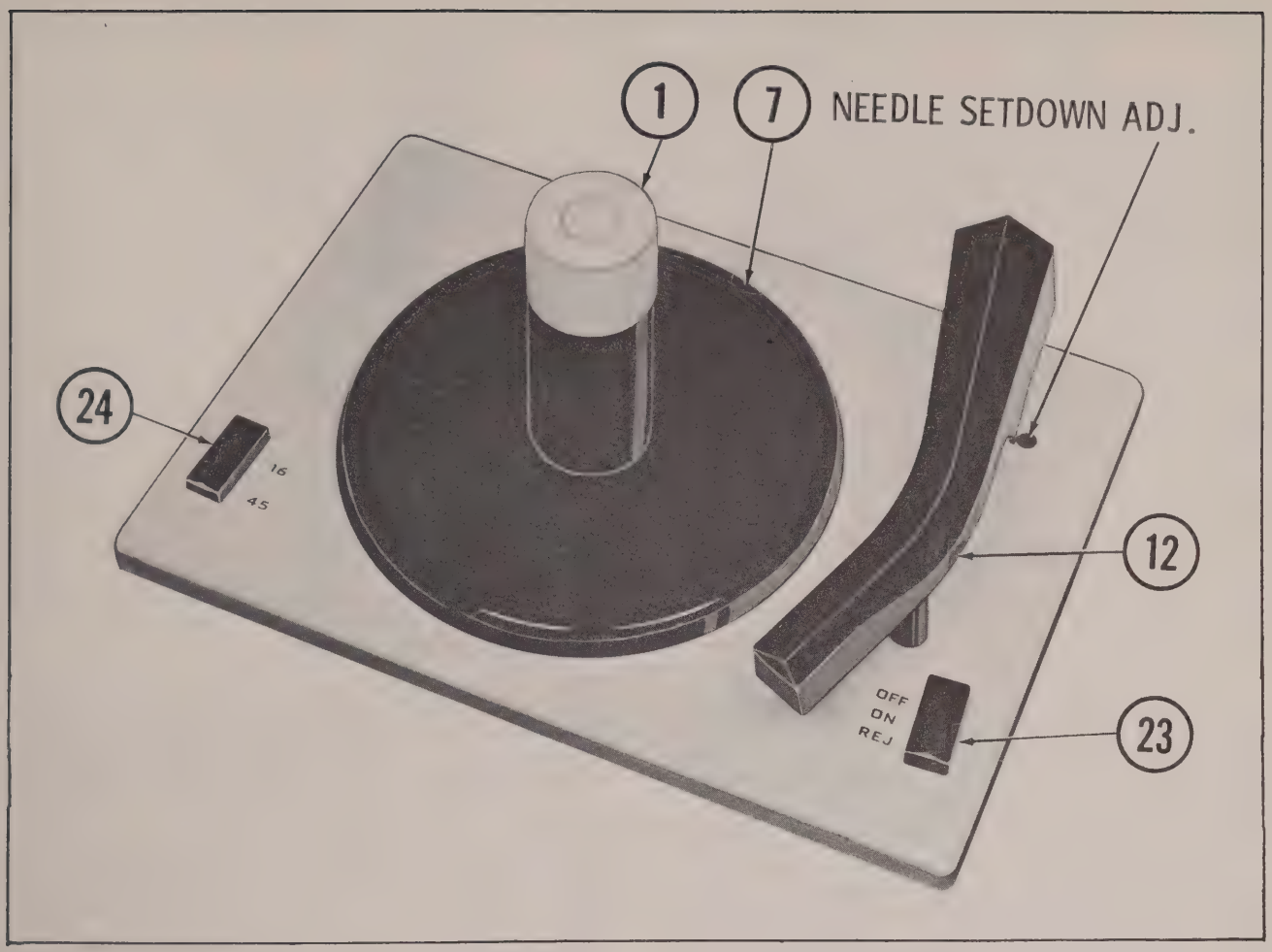


Figure 1. Top View

OPERATING INSTRUCTIONS

CAUTION: Before operating changer, always make sure that tone arm is not clipped to tone arm rest.

Loading

1. Place up to fourteen 16 2/3- or 45-rpm records on the spindle.

Starting

CAUTION: Do not operate speed change knob unless motor is running.

Make sure that speed control is in position corresponding to type of records to be played. Place Off-On-Rej. knob in Rej. and release. The changer will operate automatically until the last record has been played. The tone arm will then return to its rest, and the supply to the motor will be switched off.

Rejecting

To reject a record, place Off-On-Rej. knob in Rej. and release.

Stopping

The changer may be stopped anytime a record is playing by placing Off-On-Rej. knob in Off position. Tone arm should be lifted and placed on its rest.

Unloading

Using both hands, and with fingers under the edge of the bottom record, lift records straight up and off the spindle.

CHANGE CYCLE

Observe the change cycle operation while rotating the turntable by hand. The following description can then be readily followed, and the function of each part can be more easily understood.

This changer is provided with a positive position trip mechanism. The trip is actuated and the change cycle started when the tone arm reaches a predetermined distance from the center of a record.

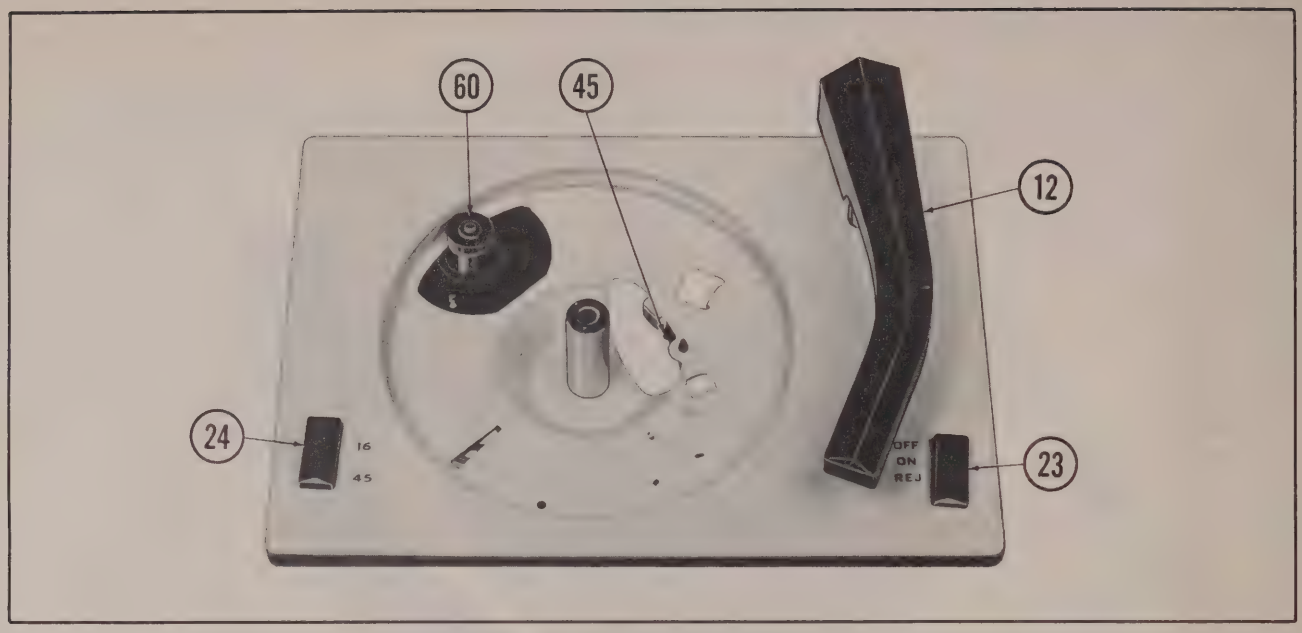


Figure 2. Top View With Turntable Removed

The tone arm and hinge assembly, and the tone arm shaft are connected so that they move in unison. As the tone arm nears the end of a record, trip spring (39) engages trip actuator (45), pivoting trip pawl (49) toward the turntable hub. When the tone arm has reached a predetermined distance from the center of the record (within the diameter of the record trip grooves), trip pawl (49) engages the projection on the turntable hub. Contact between the trip pawl and turntable hub projection gives the required push for the teeth in cam gear assembly (47) to engage the teeth in the turntable hub, rotating the cam gear.

As cam gear (47) begins to rotate, lift pin (40) travels up the cam incline (point "A", Fig. 3). When the lift pin reaches the top of the incline, the follower stud on the end of follower arm assembly (36) contacts the cammed surface (point "B", Fig. 3), and pivots the tone arm outward.

When the tone arm is positioned over rest post (22), lift pin (40) rides up the small incline (point "C", Fig. 3), raising the cartridge end of the tone arm to the height of a record resting on spindle bolts (4).

The follower stud on follower arm assembly (36) follows the cammed groove (point "D", Fig. 3) in cam gear (47), moving the tone arm inward toward the center of the record.

When a record is resting on spindle bolts (4), the inward travel of the tone arm is stopped by the edge of the record. Since adjusting arm assembly (35) is permanently staked to tone arm shaft (37), its inward movement is also stopped. However, the follower stud on follower arm assembly (36) continues to follow the cam groove (point "D", Fig. 3) toward the center of the cam gear and then back out. Tension of follower arm spring (38) returns follower arm assembly (36) and adjusting arm assembly (35) to their original positions.

As the tone arm moves outward from the record stack, ejector arm (52) starts down the incline of ejecting spring (50) and begins to actuate the spindle, in order to drop the next record. At the same time, lift pin (40) rides down the small incline (point "E", Fig. 3), lowering the tone arm below the record stack.

Inside the spindle, actuator rod (6) raises and, with its cone point, begins to extend separator blades (3) out of the spindle housing. After the separator blades have projected far enough to separate the bottom record of the stack, bolts (4) retract into the spindle, in order to allow the bottom record to drop to the turntable. The bolts are actuated by the outward movement of the separator blades. After the record has dropped, actuator rod (6) is lowered, bolts (4) extend, and separator blades (3) retract, in order to allow the next record to drop into position on the bolts.

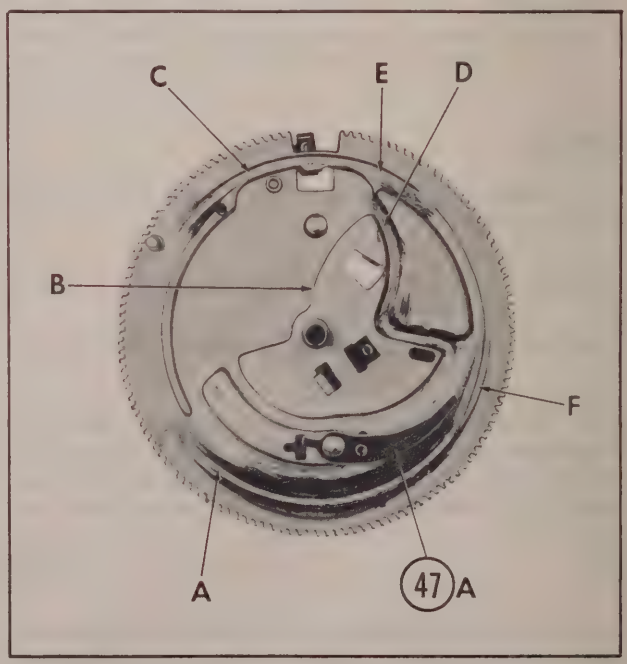


Figure 3. Top View of Cam Gear

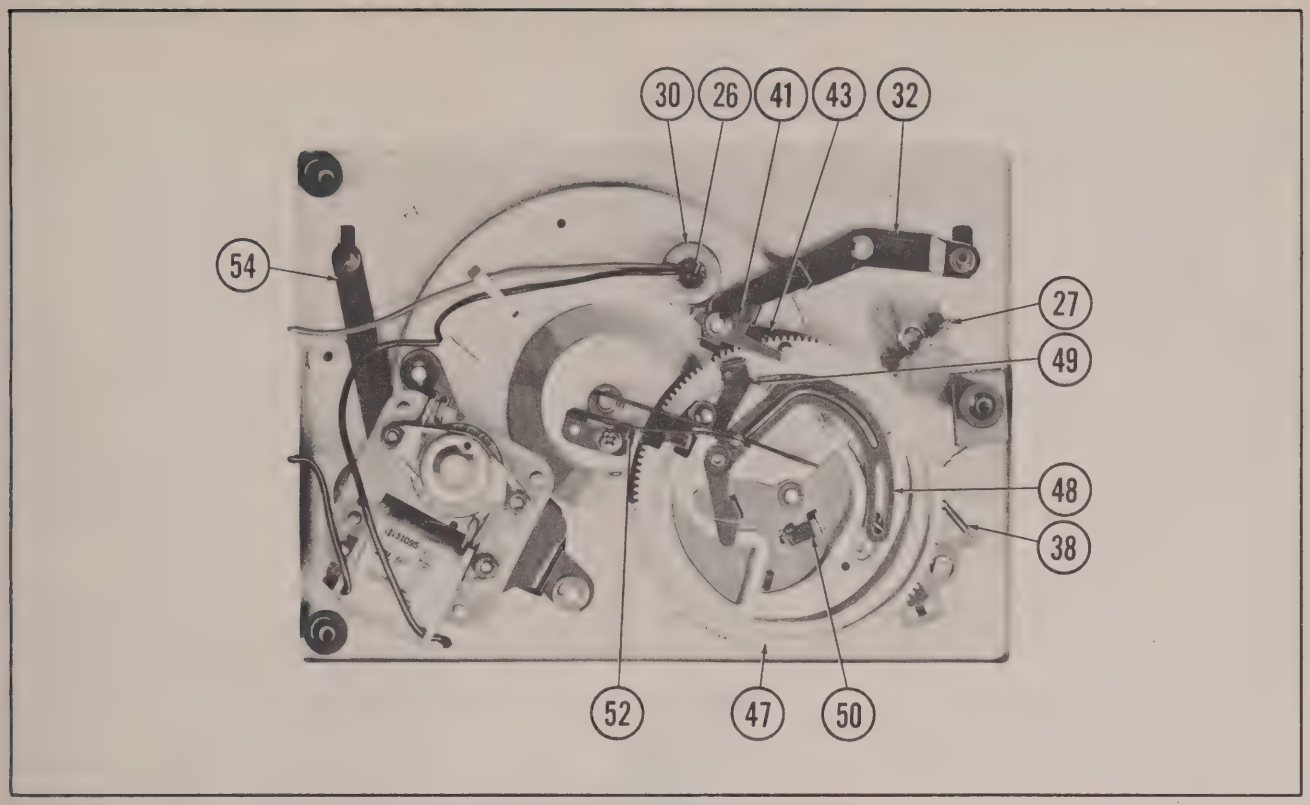


Figure 4. Bottom View

As cam gear (47) continues to rotate, the follower stud on follower arm assembly (36) follows along the inside edge of shuttle (47A) to position the tone arm directly above the point of landing. Lift pin (40) rides down the incline (point "F", Fig. 3) of cam gear (47), lowering the tone arm to the record lead-in groove.

As cam gear (47) is about to complete its cycle, the tab on trip pawl (49) contacts a formed tab on the baseplate and is pivoted back into a position where it will not engage the projection on the turntable hub and cause the mechanism to cycle again.

To complete the change cycle, the detent stud of cam gear (47) catches in the cutout of detent lever (43), stopping the rotation of the cam gear. With the gear in this position, the tone arm is free to track across the record.

After the record plays and the mechanism has been tripped, the preceding sequence of cycling and playing of records is again followed until the last record has been played.

After the last record has finished playing, the changer trips, and the same cycle sequence is followed until the tone arm moves inward to contact a record stack on top of the spindle.

Since the inward movement of the tone arm is not stopped by a record, adjusting arm assembly (35) is allowed to follow along with follower arm assembly (36), which contacts the tab of shuttle actuator (48). By pivoting the shuttle actuator, shuttle (47A) is pivoted inward, closing the entrance to the inner cam groove.

With the inner cam groove closed, the stud on follower arm assembly (36) is forced to follow the outer edge of the shuttle and the outer cam groove. This outer groove keeps the tone arm position over the rest post.

Pivoting of shuttle actuator (48) caused the mechanism to shut off. As the mechanism nears the end of the shutoff cycle, the turned-down tab of shuttle actuator (48) contacts switch lever (41) and pivots the lever to shut off AC switch (26).

SERVICING INSTRUCTIONS

Needle Setdown

The setdown position of the needle is adjusted by the screw on adjusting arm assembly (35). A hole beside the hinge post provides access to this screw.

Tone Arm Height

Tone arm height is adjusted by lift screw (14). To raise the tone arm, turn the screw counterclockwise. To lower the arm, turn the screw clockwise.

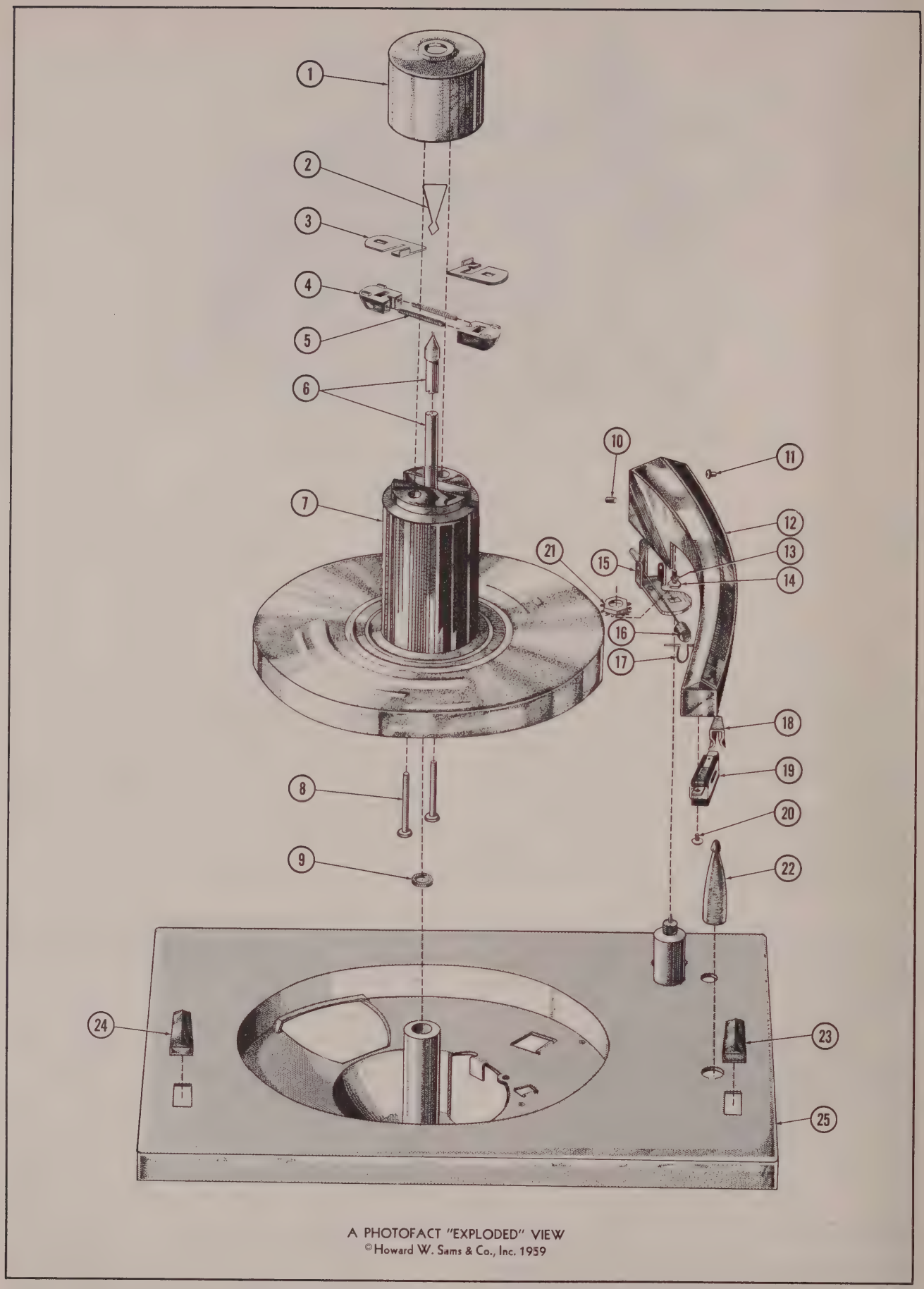


Figure 5A. Exploded View of Parts Above Baseplate

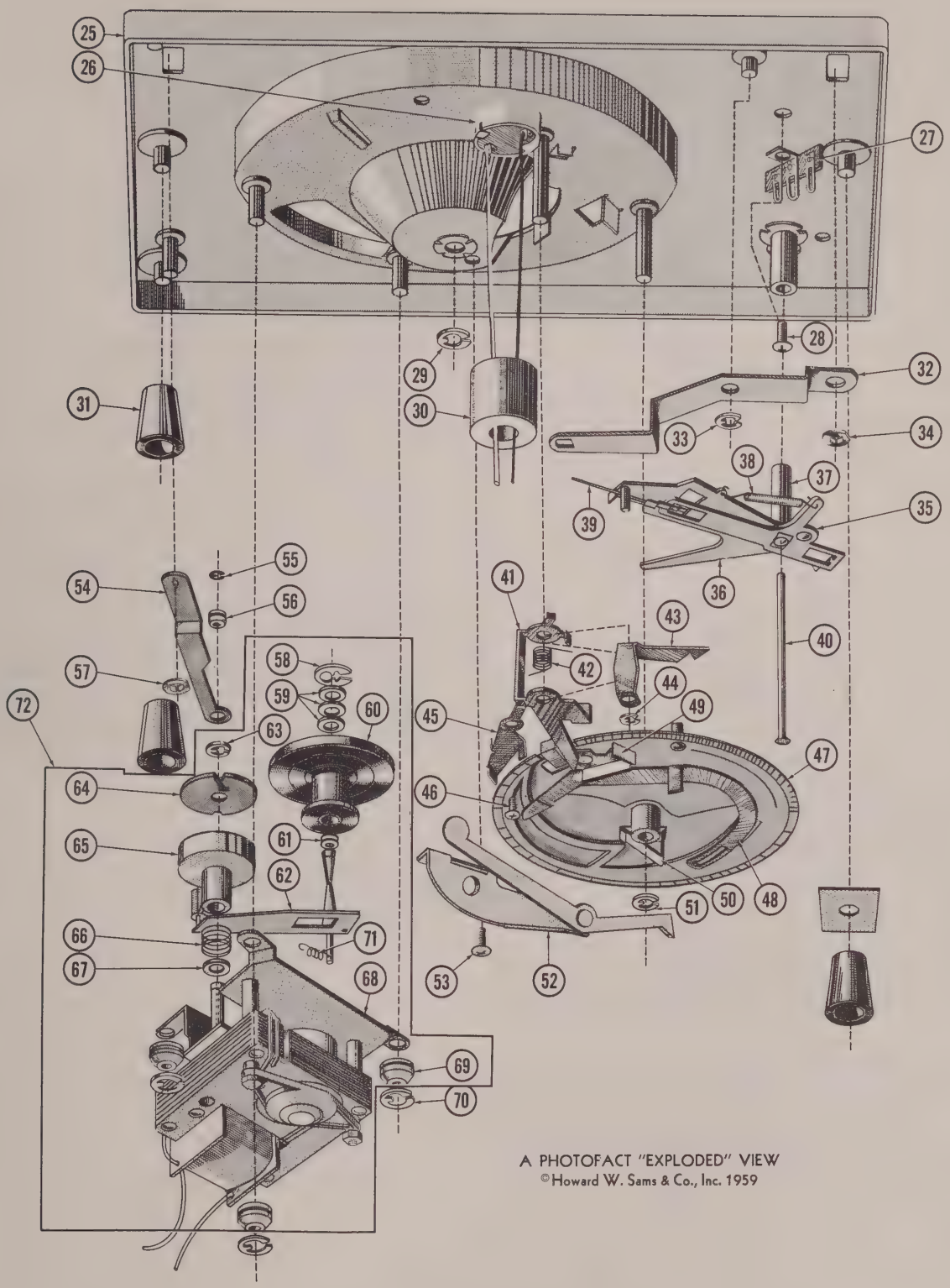


Figure 5B. Exploded View of Parts Below Baseplate

The tone arm height should be adjusted so that the top of the tone arm clears the bottom of the record by approximately 1/16" when the changer is center-tripped and a record is resting on the spindle bolts.

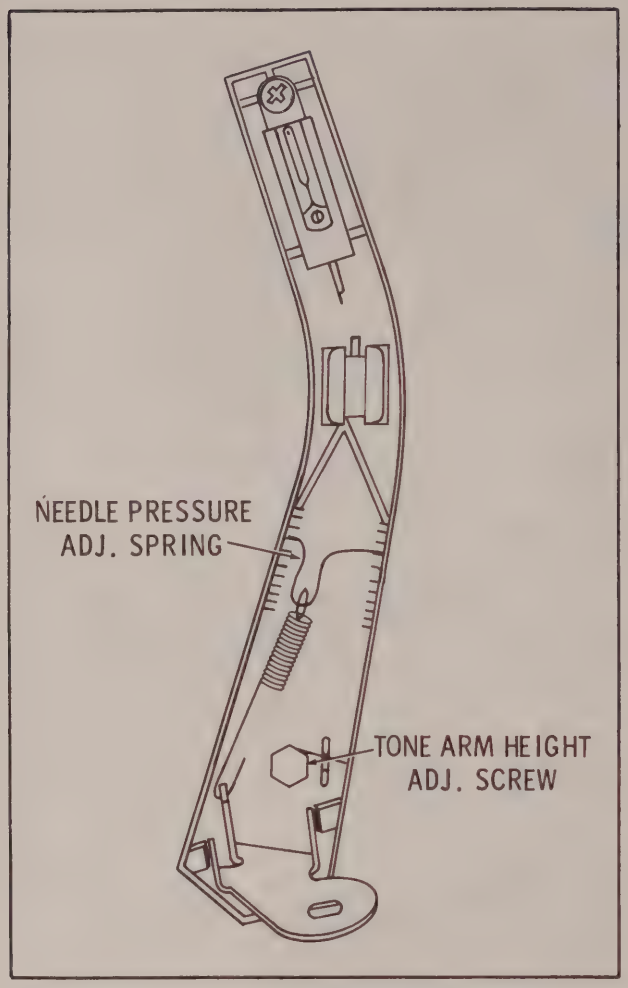


Figure 6. Tone Arm Adjustment Points

Needle Pressure

Needle pressure should be between six and eight grams. To adjust, move spring clip (17) backward or forward until correct needle pressure is obtained.

Needle Replacement

To replace the needle, loosen the screw at the rear of the needle shank and slide the needle forward. When replacing the needle, the channel formed near the needle tip must be placed directly over the element connector.

Motor Maintenance and Replacement

If the turntable stops or slows down during cycle, occasional maintenance of the motor drive system may be required. Remove "C" washer (29) and lift the turntable assembly straight up. Idler wheel (60), motor drive shaft, and inside rim of the turntable should be cleaned with a lint-free cloth and alcohol. When replacing the turntable, make sure the mechanism is out of cycle and trip pawl (49) is pushed back away from the turntable hub.

To replace idler wheel (60), remove the motor assembly from the baseplate by removing three "C" washers (70), lower the motor until it clears the mounting studs and remove idler wheel "C" washer (58). When replacing the motor, make sure motor shift arm (54) is toward the inside of motor; otherwise, the speeds will be reversed.

Turntable and Spindle Assembly

Should the turntable and spindle assembly ever need to be disassembled, be careful not to lose the blade and bolt springs.

When reassembling the spindle, the easiest method is to start by installing actuator rod assembly (6). Then, place the turntable on the unit. This allows the actuator rod to drop to its lowest level. Next, assemble bolts (4) and bolt springs (5) in the spindle slot. Hook separator blades (3) together and assemble to bolts (4). The tabs on the separator blades fit into the slots in the bolts. Separator blade spring (2) is assembled into the slots in the separator blades, and the spindle cap is put on, with the screw holes aligned. Hold the spindle cap tightly to the spindle, remove the turntable assembly, and fasten the spindle cap with cap screws (8).

Lubrication

Additional lubrication should not be required for the life of the changer, but in cases of unusual use or high-operating temperature, the changer should be lubricated as follows:

Apply Andok "B" or Texaco Sta-Put to:

1. Cam grooves on top side of cam gear (47).

Apply one drop of light mineral oil to:

1. Cam gear (47) mounting shaft.
2. Turntable bearing.
3. Top and bottom motor bearings.

TROUBLE CHART

SYMPTOM	CAUSE	REMEDY
Turntable does not revolve when control is placed in On position.	1. No current at motor.	1. Make sure that current is reaching AC leads of changer and switch (26) is closing.

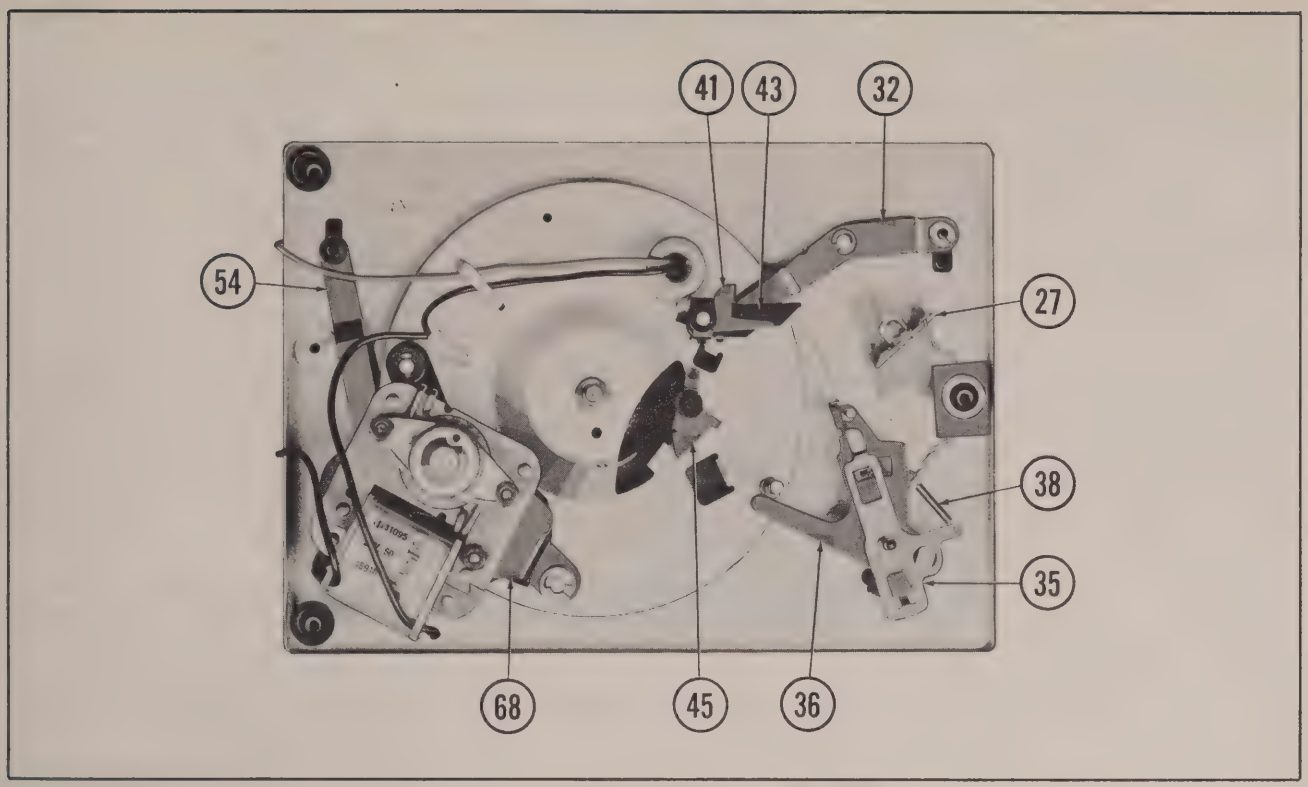


Figure 7. Bottom View With Cam Gear Removed

TROUBLE CHART (Cont.)

SYMPTOM	CAUSE	REMEDY
	2. Defective motor.	2. Remove turntable and allow motor to run without load. If current is reaching motor and drive shaft does not rotate, the motor is defective. Repair or replace motor.
Turntable speed too slow.	1. Binding in turntable bearing.	1. Hold idler wheel (60) away from the turntable rim and turn the turntable by hand, to see if it turns without binding. If binding occurs, remove turntable, clean foreign matter from bearing, and lubricate with light mineral oil.
Turntable stalls or slows down during cycle.	1. Idler wheel (60) not contacting turntable rim with sufficient pressure.	1. Idler spring (71) disconnected or broken. Replace idler spring (71).
	2. Binding in drive mechanism.	2. Hold idler wheel (60) away from turntable rim and cycle machine by turning turntable slowly by hand. Cam gear (47) should turn freely during the complete revolution without binding at any point. If binding occurs, check for foreign matter or bent parts.
	3. Motor drive system not functioning properly.	3. See "Motor Maintenance and Replacement" under "Servicing Instructions."
Changer continues to cycle.	1. Changer not level.	1. Make certain that changer is level, or continuous cycling may result.

TROUBLE CHART (Cont.)

SYMPTOM	CAUSE	REMEDY
	2. Trip pawl (49) bent.	2. Straighten trip pawl (49) so that it is moved away from the turntable hub as the changer completes its cycle.
Changer does not cycle when needle reaches end of record.	1. Trip actuator (45) binding or bent.	1. Clean, straighten, or replace. When engaged by trip spring (39), trip actuator (45) should move trip pawl (49) toward the turntable hub.
	2. Trip spring (39) bent, broken, or missing.	2. Straighten or replace trip spring (39).
Needle does not properly track across record.	1. Needle may be clogged by an accumulation of foreign matter.	1. Clean needle with a soft brush.
	2. Needle tip worn or chipped.	2. Replace needle.
	3. Tone arm leads too tight.	3. Give the tone arm leads enough slack to allow the tone arm to move freely across record.
	4. Tone arm shaft (37) binding in housing.	4. Clean foreign matter from tone arm shaft (37) and housing.
	5. Insufficient needle pressure.	5. Needle pressure should be 6 to 8 grams. Adjust by moving spring clip (17) backward or forward until correct pressure is obtained.
Erratic tone arm movement.	1. Follower arm spring (38) disconnected or broken.	1. Replace follower arm spring (38).

Ref. No.	Part No.	Description
1	*14993	Spindle Cap
2	14992	Spring, Blade Return
3	14989	Separator Blade
4	14990	Bolt
5	14991	Spring, Bolt
6	14987	Actuator Rod Ass'y.
7	*14984	Turntable Ass'y.
8	14646	Screw, #4-24 X 1"
9	14966	Washer, Bearing-Turntable
	*14904	Tone Arm & Hinge Ass'y. —
		Consists of:
10	4923	Hinge Pivot Screw
11	14914	Hinge Pivot Button
12	*14903	Tone Arm
13	7634	Lock Spring, Lift Screw
14	7635	Lift Screw
15	14917	Hinge Arm
16	14915	Hinge Spring
17	14916	Adjusting Spring
18	6963	Tone Arm Clip
19	14918	Cartridge, Astatic 310
		14627 Needle Unit, Sapphire
20	4262	Cartridge Mtg. Screw
21	14498	Nut & Lockwasher, Tone Arm Mtg.
22	*14967	Rest Post
23	*14966	Control Knob, On-Off-Rej.
24	*14966	Control Knob, Speed Selector
25	*14961	Baseplate Ass'y.
26	14575	AC Switch
27	1895	Terminal Strip
28	5718	Screw, Rest Post Mtg.
29	1651	"C" Washer, Turntable Mtg.
30	1737	Switch Cover
31	14960	Mounting Cup, Rubber
32	14952	Control Lever
33	1652	"C" Washer
34	4401	Speed Nut, Knob Mtg.
	14921	Tone Arm Shaft Ass'y., Consists of:
35	14980	Adjusting Arm Ass'y.
36	14937	Follower Arm Ass'y.
37	14922	Tone Arm Shaft
38	14926	Spring, Follower Arm
39	14927	Trip Spring
40	14955	Lift Pin
41	14948	Switch Lever
42	14950	Spring, Switch Lever
43	14949	Detent Lever
44	1652	"C" Washer
45	14954	Trip Actuator
46	18928	Shoulder Screw, #6-32
47	14930	Cam Gear Ass'y., Consists of:
47A	14935	Shuttle (Located on top side of cam. Not shown on exploded view.)
48	14934	Shuttle Actuator
49	14936	Trip Pawl
50	14962	Ejecting Spring
51	1652	"C" Washer
52	14957	Ejector Bracket Ass'y.
53	18492	Screw, #8-32 X 1/4
54	14968	Motor, Shift Arm
55	1588	"C" Washer
56	5040	Rubber Grommet
57	4401	Speed Nut, Knob Mtg.
58	1652	"C" Washer
59	2583	Fibre Washer
60	16929	Idler Wheel
61	2583	Fibre Washer
62	16927	Idler Link Ass'y.
63	1652	"C" Washer
64	16922	Cam Follower
65	16921	Cam & Link
66	16923	Cam Spring
67	16924	Spring Cup
68	16918	Motor Plate Ass'y.
69	2773	Grommet
70	5022	"C" Washer
71	16928	Idler Spring
72	16916	Motor Ass'y (complete) 90V 60 Cycle

* When ordering specify color.

PHOTOFACT* Folder
with CIRCUITRACE*

WESTINGHOUSE MODELS HR-112AN, HR-113AN (Ch. V-2503-1)

WESTINGHOUSE MODELS HR-112AN, HR-113AN (Ch. V-2503-1)

MODEL HR-112AN

TRADE NAME	Westinghouse Models HR-112AN, HR-113AN (CH. V-2503-1)
MANUFACTURER	Westinghouse Electric Corp., TV-Radio Div., Metuchen, N. J.
TYPE SET	AC Operated AM Receiver With 4 Speed Automatic Record Changer
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AX7 AF Amp.-Phase Inv., (2) 35C5 Output
POWER SUPPLY	105-120 Volts AC-60 Cycles
RATING	.37 Amp. @117 Volts AC (33 Watts Less Motor)
TUNING RANGE—BROADCAST	540-1600KC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR COLLARO CONQUEST (REVISED)-PHOTOFACT SET 408 FOLDER 6.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

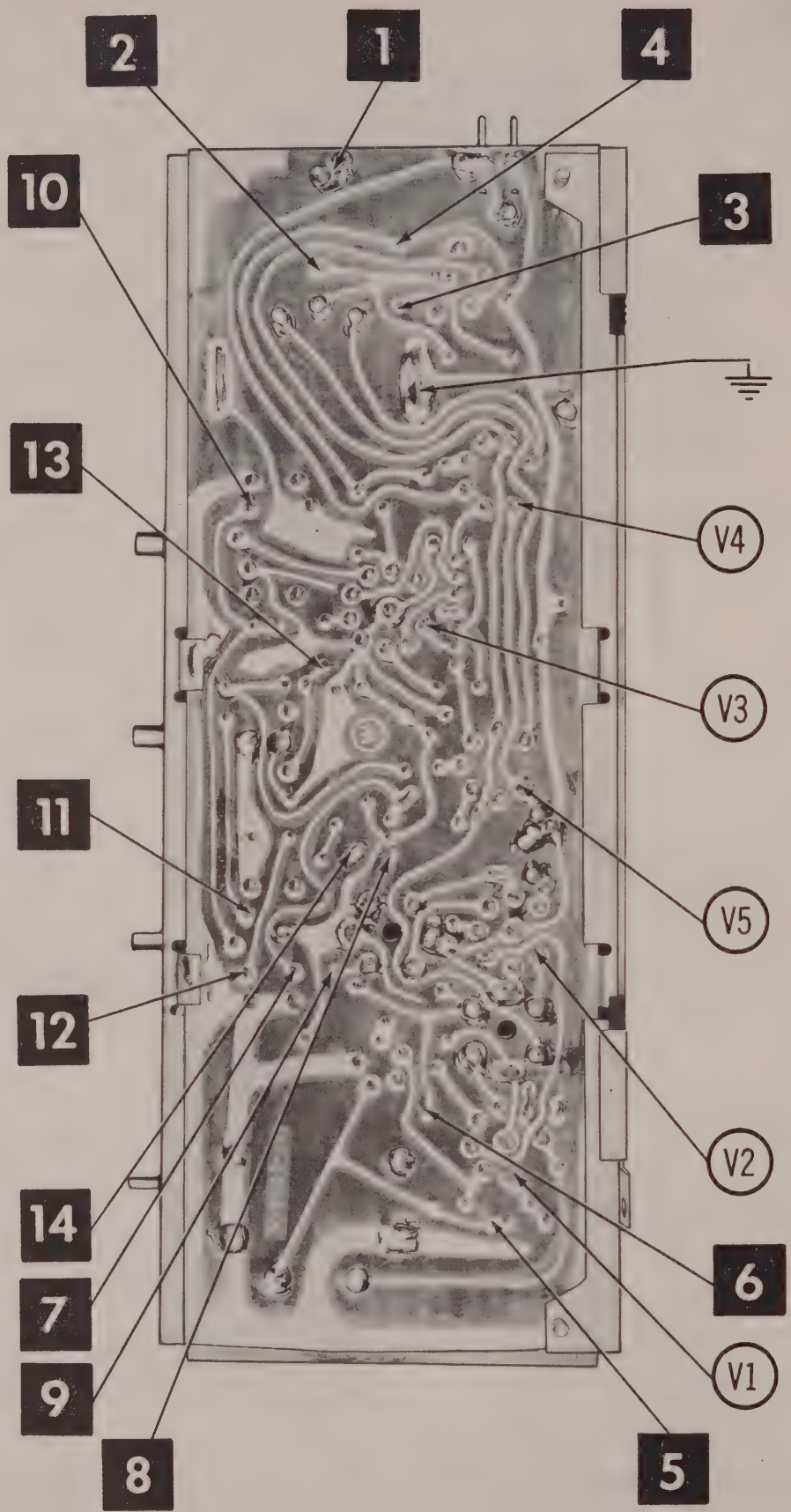
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	200mmf	High side to antenna stator lug of tuning gang. Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.	"	"	1625KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

WESTINGHOUSE MODELS HR-112AN, HR-113AN (Ch. V-2503-1)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

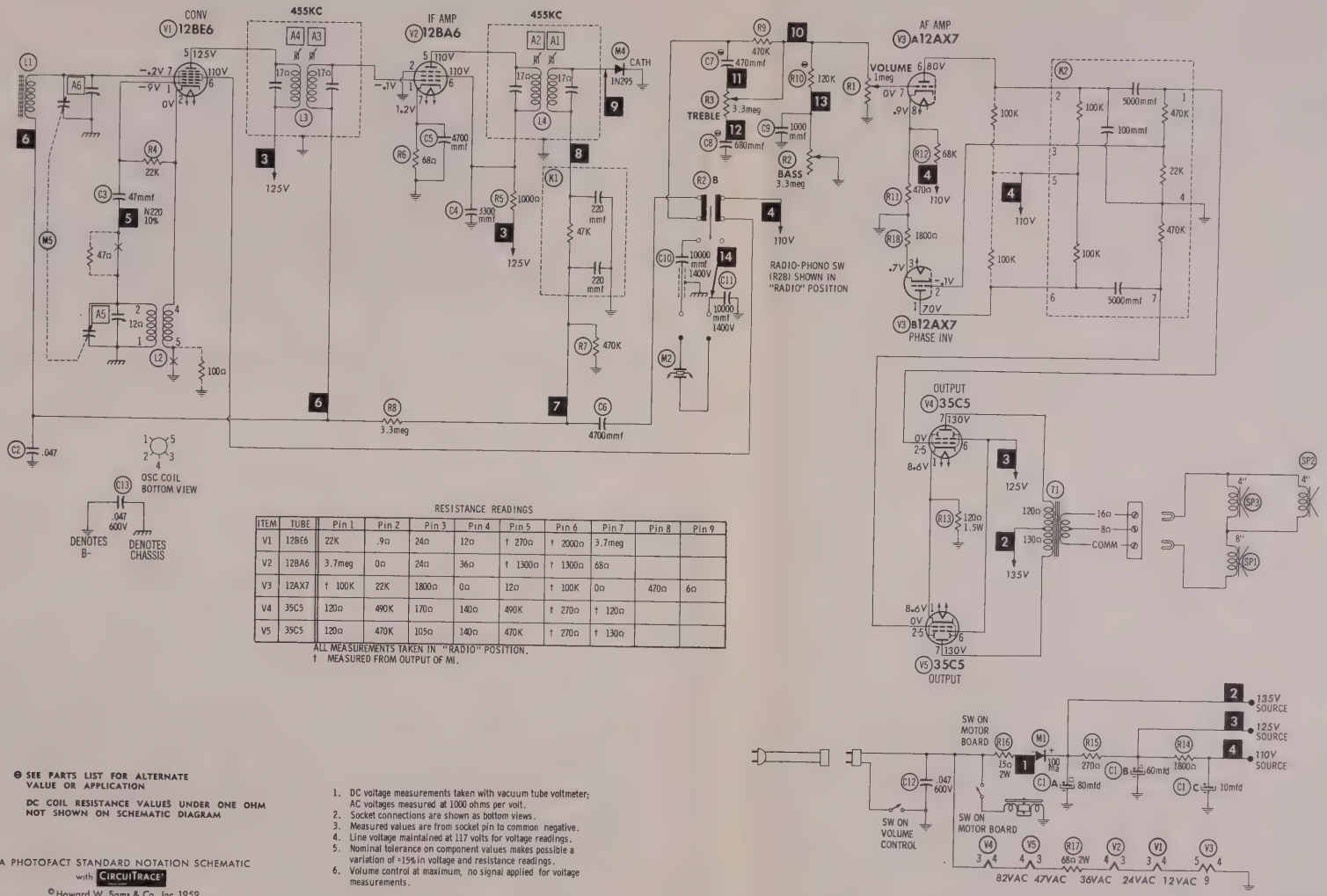
SET 426 FOLDER 16



A Howard W. Sams CIRCUITRACE Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BE6	22K	.9Ω	24Ω	12Ω	† 270Ω	† 2000Ω	3.7meg		
V2	12BA6	3.7meg	0Ω	24Ω	36Ω	† 1300Ω	† 1300Ω	68Ω		
V3	12AX7	† 100K	22K	1800Ω	0Ω	12Ω	† 100K	0Ω	470Ω	6Ω
V4	35C5	120Ω	490K	170Ω	140Ω	490K	† 270Ω	† 120Ω		
V5	35C5	120Ω	470K	105Ω	140Ω	470K	† 270Ω	† 130Ω		

ALL MEASUREMENTS TAKEN IN "RADIO" POSITION.
† MEASURED FROM OUTPUT OF M1.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

©Howard W. Sams & Co., Inc. 1959

426-16

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	AF Amp-Phase Inv.	12AX7	
V4	Output	35C5	
V5	Output	35C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■ 80	150	218V025H17					FMT-339	R2713 *
B	▲ 60	150						MT-1510	
C	10	150							

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	200	210V054A73	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C3	47		215V014A70						N220 10%
C4	3300		215V103A32	BPD-0033	DD-332	BYA10D33	UC-5233	5GA-D33	
C5	4700		215V114A72	BPD-0047	DD-472	BYA10D47M	UC-5247	5GA-D47	
C6	4700		215V114A72	BPD-0047	DD-472	BYA10D47M	UC-5247	5GA-D47	
C7	470			BPD-00047	DD-471	L10T47	UC-5347	5GA-T47	①
C8	680			BPD-00068	DD-681	L10T68	UC-5368	5GA-T68	②
C9	1000		215V101A02	BPD-001	DD-102	BYA6D1	DC-521	5HK-D1	
C10	10000	1400	215V201A03	DAC-27	DD16-103	HVE16S1		20HK-S1	
C11	10000	1400	215V201A03	DAC-27	DD16-103	HVE16S1		20HK-S1	
C12	.047	600	210V024A73	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C13	.047	600	210V214A73	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	

① Some versions may use 220mmf in this application (Part #215V102A21).
② Some versions may use 330mmf in this application (Part #215V103A31).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	270V027H08					Volume
B	Switch							Power On-Off
R2A	3.3meg	½	270V052H01					Bass
B	Switch							Phono-Radio
R3	3.3meg	½	270V027H07					Treble

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Westinghouse PART No.	NOTES
	OHMS	WATT		
R4	22K		250V222A23	
R5	1000Ω		250V221A02	
R6	68Ω		250V226A80	
R7	470K		250V224A74	
R8	3.3meg		250V223A35	
R9	470K		250V224A74	
R10	120K		250V221A24	Note 1
R11	470Ω		250V224A71	
R12	68K		250V226A83	
R13	120Ω	1.5	251V023H19	
R14	1800Ω		250V221A82	
R15	270Ω		250V222A71	
R16	15Ω	2	251V023H13	
R17	68Ω	2	250V426A80	
R18	1800Ω		250V221A82	

Note 1. Some versions may use 180K in this application (Part #250V221A84).

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Westinghouse PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Stick	310V030H01					
L2	Osc. Trans	230V061H01					
L3	Input IF	235V042HC	16-6780	BC-356	12-C1	RF-4	
L4	Output IF	235V042H02	16-6780	BC-357	12-C2	RF-4	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	4100Ω CT	15Ω Tap ⓐ 8Ω	430V058H01	Z1002①	A-2901①	AU-600①	A-3823①	24S61①	S-53X①	① Use Original Channel Frame

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	QUAM PART No.	
SP1	8"	PM	14-16Ω	570V048H01	8A21Z14	
SP2	4"	PM	3-4Ω	570V049H01	4A07	
SP3	4"	PM	3-4Ω	570V049H01	4A07	

PARTS LIST AND DESCRIPTIONS (Continued)

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Westinghouse PART No.	REPLACEMENT DATA
K1 K2	Diode RF Filter Audio Couplate	220mmf, 220mmt, 47K 100mmf, 5000mmt, 5000mmf, 22K, 470K, 470K, 100K, 100K	219V033H02 219V024H01	Centralab PC-51

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	Westinghouse PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.102A	295V012H02	1235AH	RS150	150 K200 ①	① Silicon Type

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	Westinghouse PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2		81-TB				

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	Westinghouse PART No.	JENSEN PART No.	WALCO PART No.	
M3				

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		Westinghouse PART No.	CBS PART No.	SYLVANIA PART No.	
M4	1N295	296V002H01	1N60	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M5	Tuning Cap. Printed Board	330V010H02 V-2503-1B	2 Gang

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

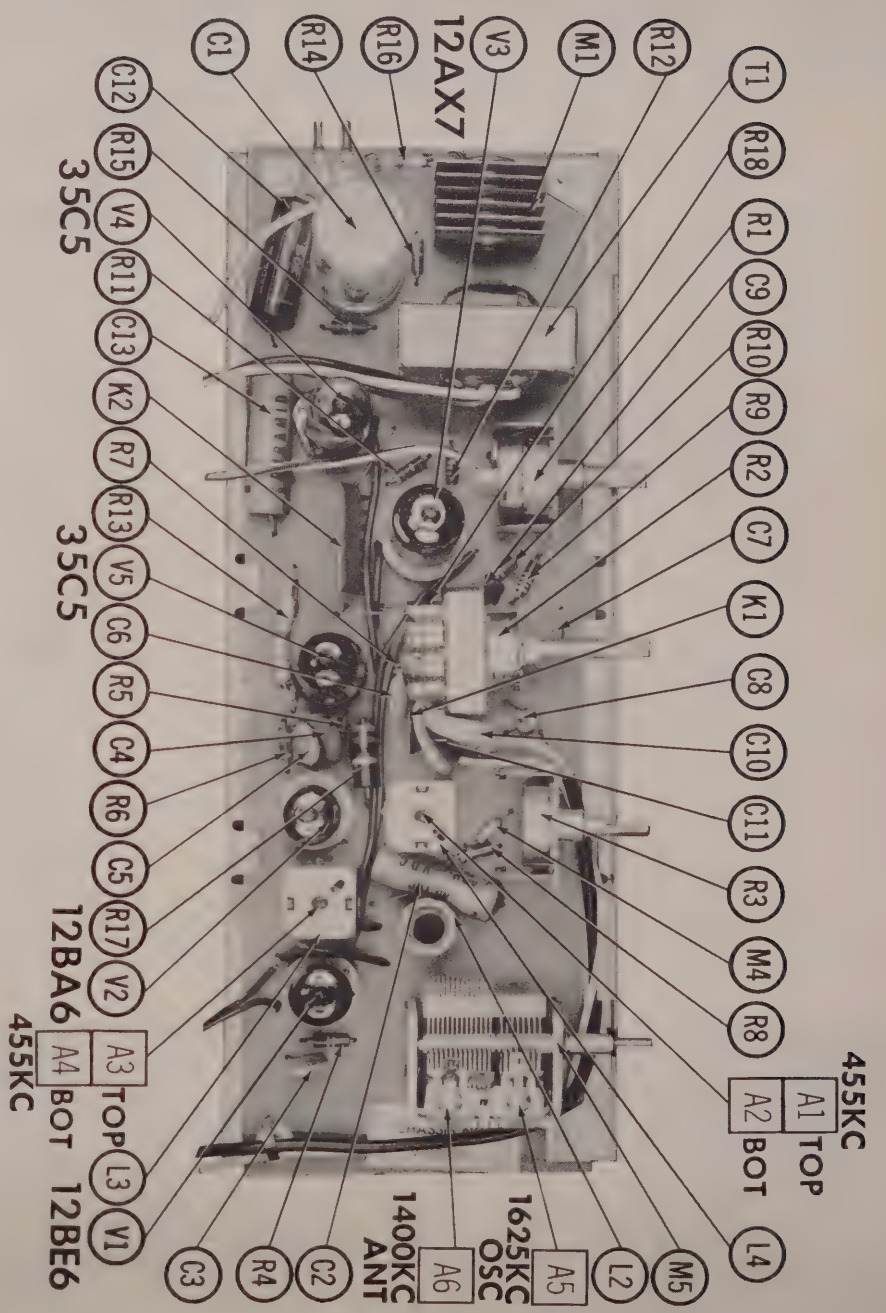
NAME	PART NO.	DESCRIPTION
Knob	550V084H01	On-Off-Volume, Bass, Treble
Knob	550V030H01	Tuning
Knob	550V019H01	Dial
Leg	518V001H11	Model HR-112AN
Leg	518V001H12	Model HR-113AN
Cabinet	516V053H01	Model HR-112AN
Cabinet	516V053H02	Model HR-113AN

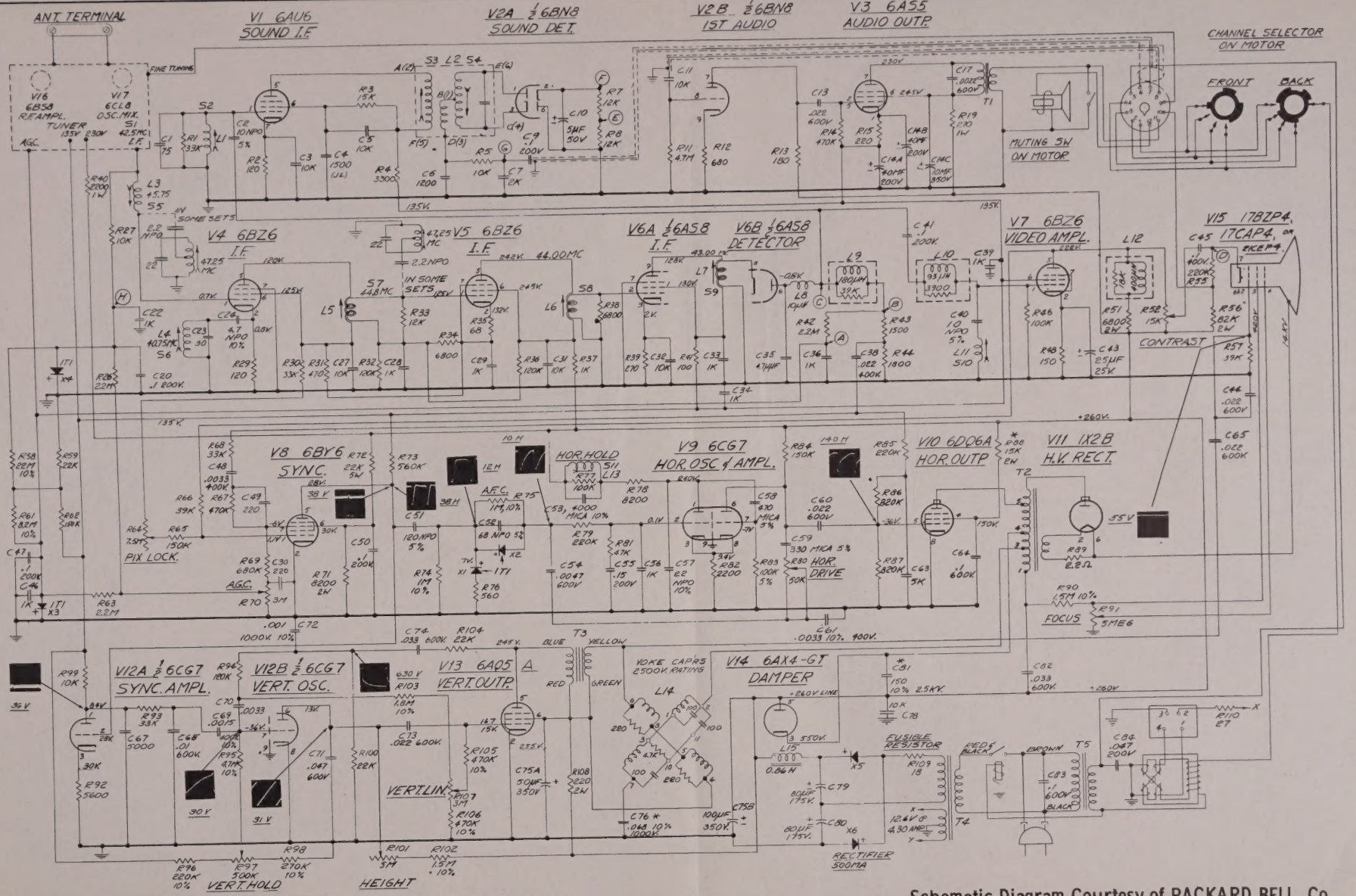
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874

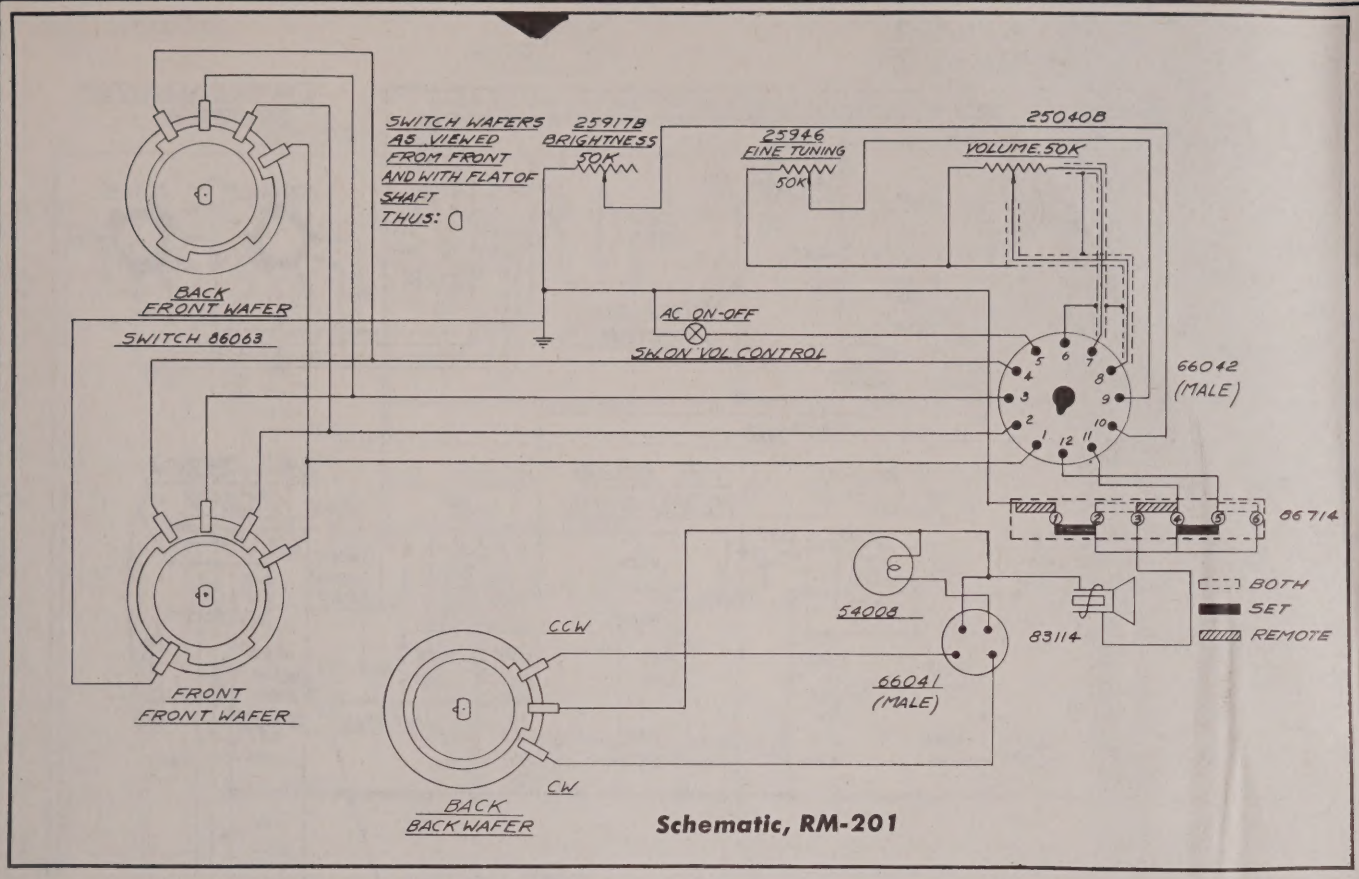
CHASSIS—TOP VIEW





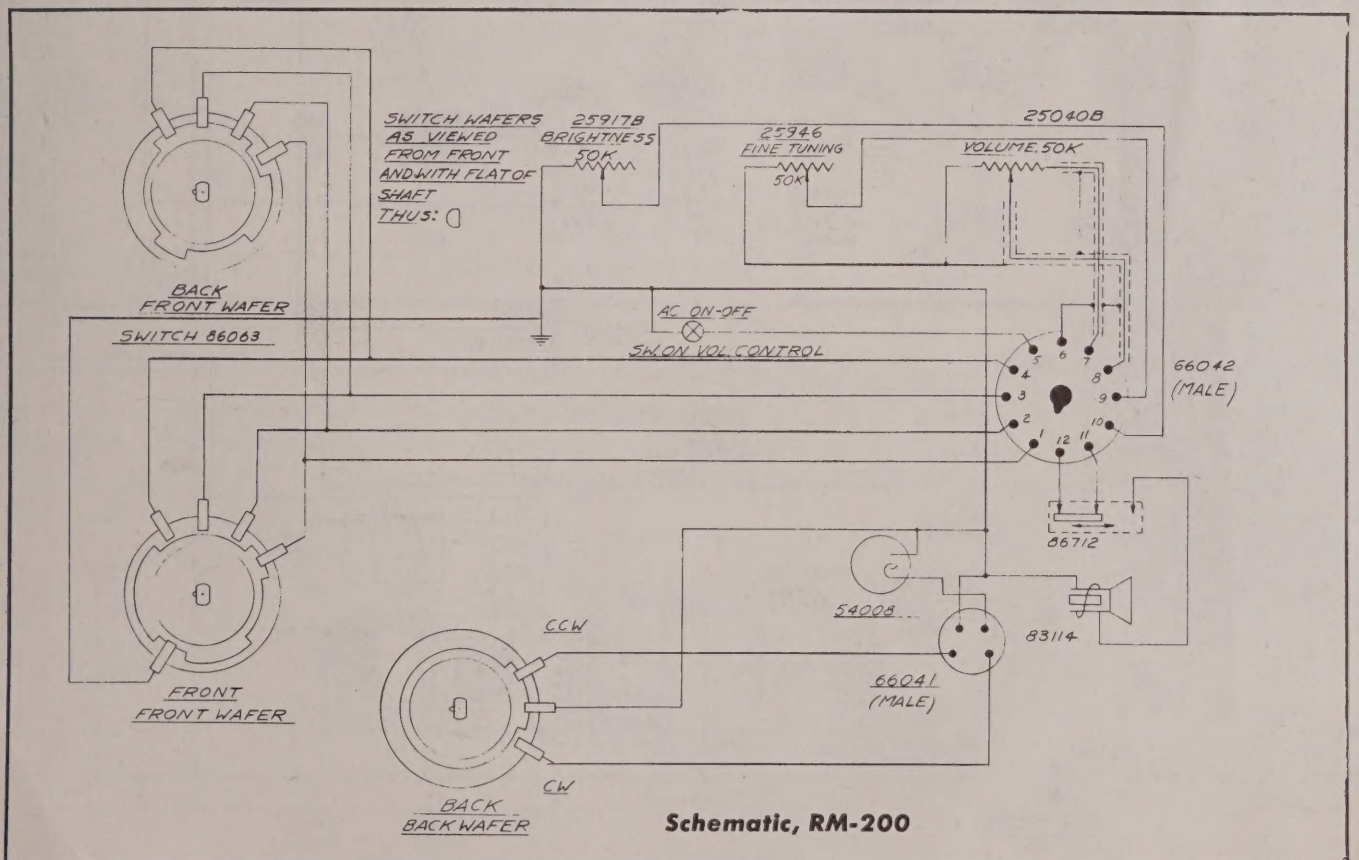
PACKARD BELL MODELS 17VT7, 21VT5 (Ch. V8-4, RM-200, RM-201)

Schematic Diagram Courtesy of PACKARD BELL Co.



Schematic, RM-201

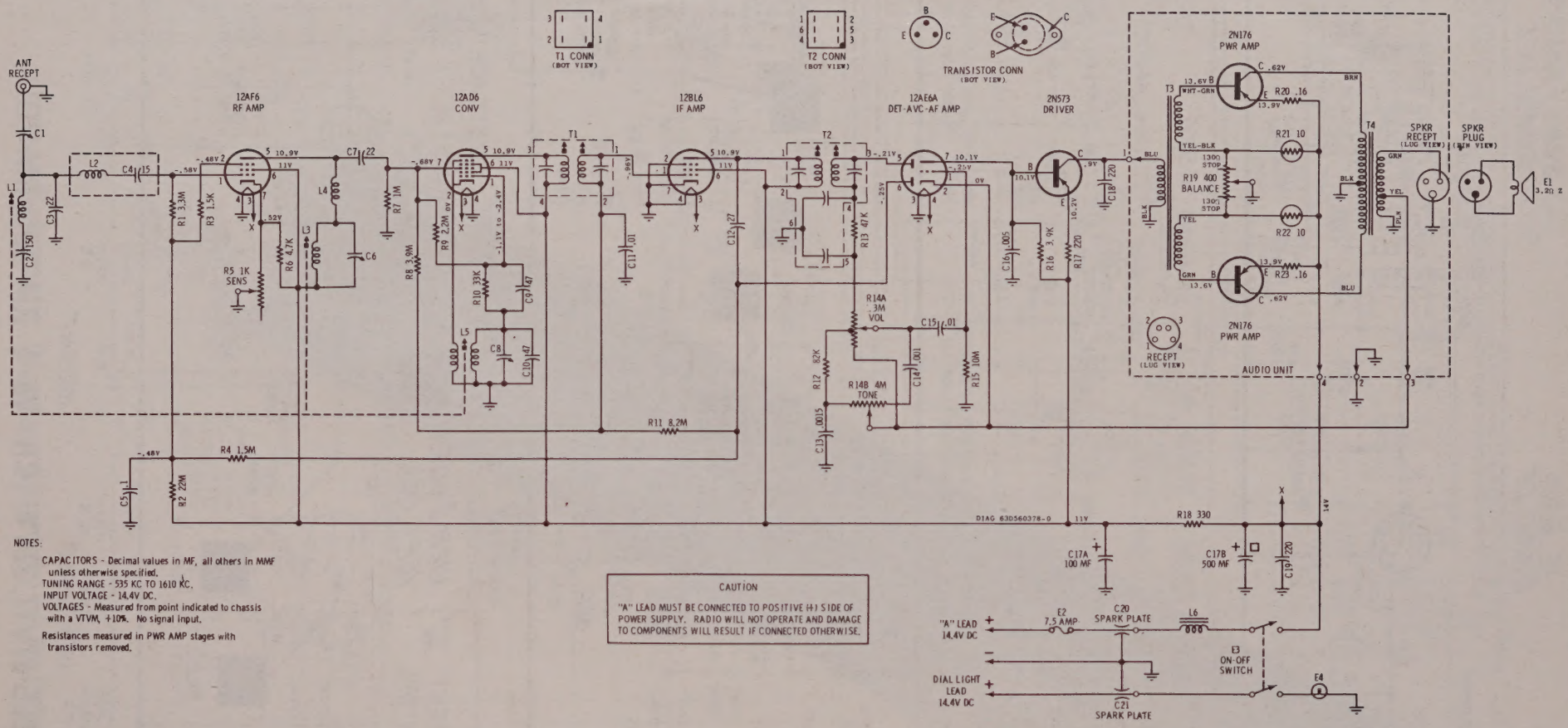
Schematic Diagram Courtesy of PACKARD BELL Co.



Schematic, RM-200

Schematic Diagram Courtesy of PACKARD BELL Co.

© Howard W. Sams & Co., Inc. 1959



NOTES:

CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
TUNING RANGE - 535 KC TO 1610 KC.
INPUT VOLTAGE - 14.4V DC.
VOLTAGES - Measured from point indicated to chassis with a VTVM, ±10%. No signal input.

Resistances measured in PWR AMP stages with transistors removed.

CAUTION

"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.

FORD MODEL 94MS (B9SF-18805-B, B9SF-18A801-B, B9SF-19061-A)

Schematic Diagram Courtesy of MOTOROLA INC.